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AMERICAN GAS JOURNAL

Established 185[illegible] Pioneer of the Gas Industry

Manufactured and Natural Gas

BEST GAS PURIFIER

Lux

When procuring Oxide for Gas Purification always buy on analysis because it will give you an idea what to expect in way of results. Investigate the Ferric Hydroxide content.

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A PERFECT FUEL FOR SOOTLESS CITIES

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Koppers offers the by-product coke and gas industry: becker type oven plants...benzol plants... gas producers...water gas plants...liquid purification plants...by-product equipment...material handling plants...phenol removal plants, etc.

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PITTSBURGH, PA.

AMERICAN
GAS JOURNAL
Established 1859 *Pioneer of the Gas Industry*

Manufactured and Natural Gas

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H. M. RILEY, *Editor*

R. S. MCBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 134, N. 3 March, 1931 Whole Number 3687

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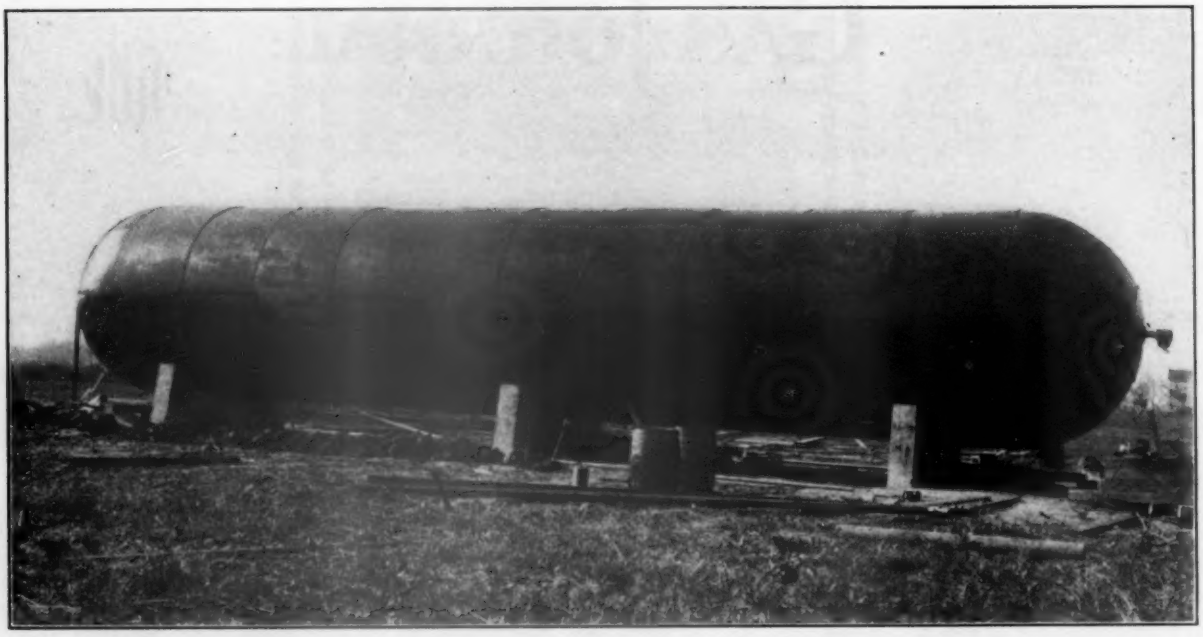
The Builders of Stacey Holders for Over 80 Years



High Pressure Gas Holder 12 ft. diameter by 66 ft. long

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THE use of steel tanks, shop assembled, for the storage of gas at high pressures has been common practice for over 30 years.
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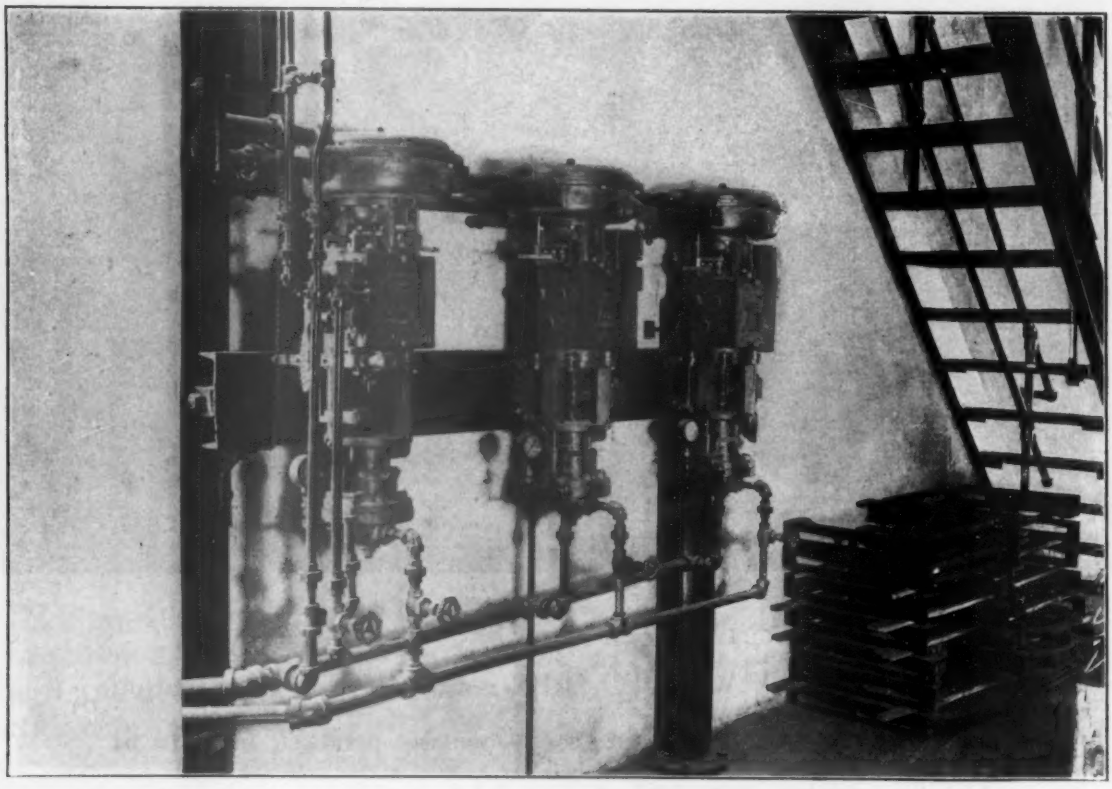
SMOOT CONTROL OF GAS MIXING



Smoot Regulators—note the rugged mechanical construction.

"Smoot Gas Mixers Respond Immediately"

A gas mixer should be quick acting and respond immediately to flow changes of the gases being mixed. There should be no time lag due to sampling or correction.

Smoot Gas Mixers measure the gas volumetrically. They consist of fast acting powerful mechanical Smoot Regulators which move the gas control valve immediately at a rate proportional to the magnitude and speed of the change in gas flow.

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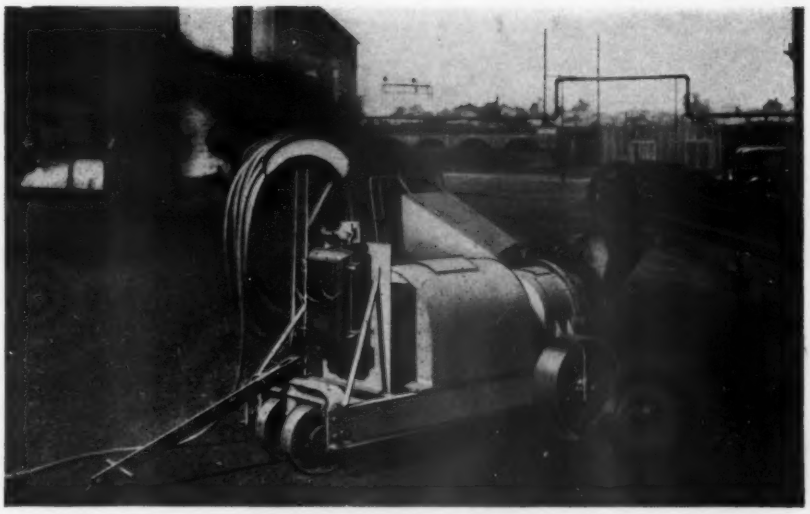

Showing the Universal Oxide Conditioner as it conditions and aerates the purifier in a single operation for the Wilmington Gas Company, Wilmington, Del.

"We are saving 75% over our former hand labor cost, since installing the Universal Oxide Conditioner — and expect to do still better. In addition, our purifier material is in far better shape."

OR THIS

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Philadelphia Coke Co., Philadelphia
Boston Consolidated Gas Co., Boston
Grand Rapids Gas Light Co., Grand Rapids
Northern Indiana Public Service Co., Ft. Wayne
Milwaukee Gas Light Co., Milwaukee

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then it's time to ACT

The Universal Oxide Conditioner

The Universal Sand Equipment Co., 1835 Columbus Road, Cleveland, Ohio.

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In the present building of a 10,000,000 cu. ft. Gas Holder . . . twice the capacity of the Holder pictured here . . . it is a decided advantage that our men have a set standard of workmanship to follow, a record to live up to. Each operation is guided by the important fact that previous installations have been gas-tight, that they've served exceedingly well through years of use, that their upkeep cost has been low.

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Manufacturers of GAS HOLDERS and other major equipment units for the GAS INDUSTRY

"For every joint on the line"

A "Short Haul" with a "Pay Load" —from Well-Head to Separator —via Victaulic

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Victaulic Couplings are available in all sizes from ¾" up for vacuum and pressure—for steel, wrought-iron and cast-iron pipe. Mail coupon below for descriptive bulletin.

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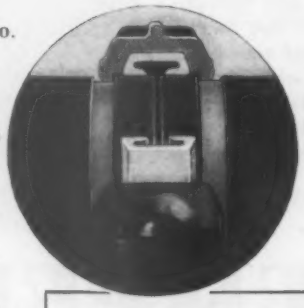

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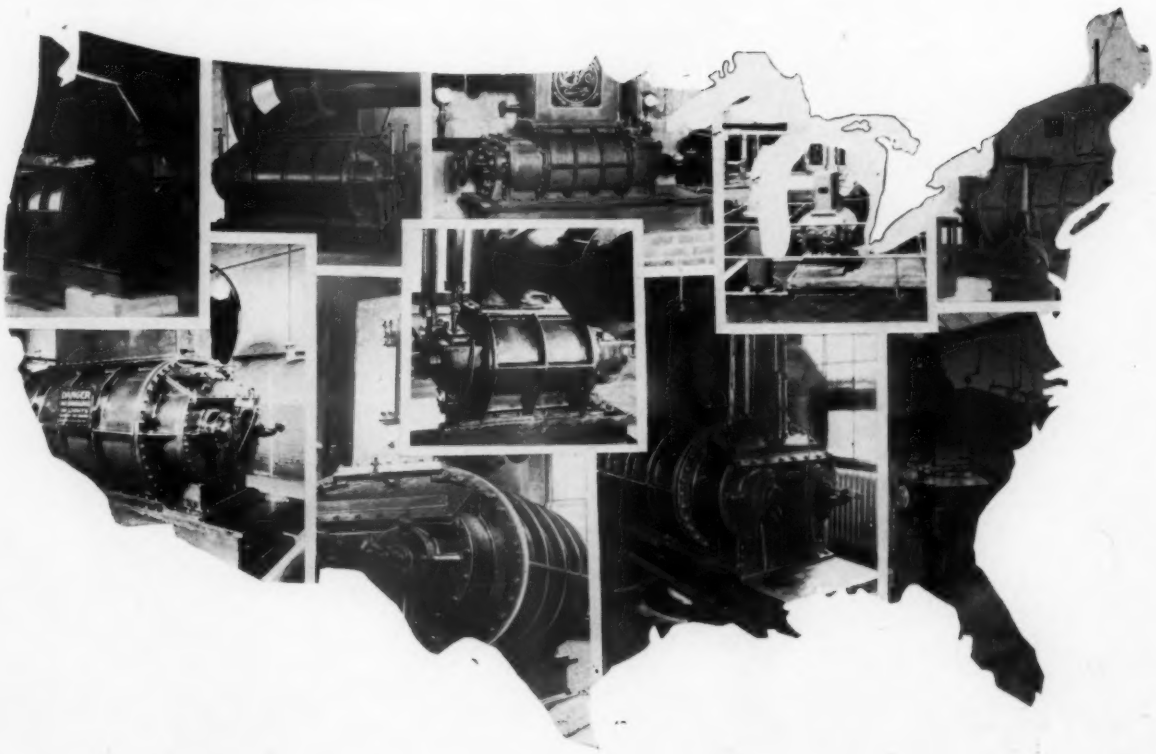

4,373,292,000 Cubic Feet *Daily*

Capacity of Connersville Meters

ALL over the country; in stations, at city gates and in industrial plants, *Connersville Rotary Positive Displacement Meters* in service have a normal capacity of 4,373,292,000 cubic feet of gas every 24 hours.

Connersville Meters are accurate on loads either far below or high above the normal ratings. The displacement is unvarying, direct reading saves time, maintenance costs are negligible and the differential is low—normally less than 1" of water.

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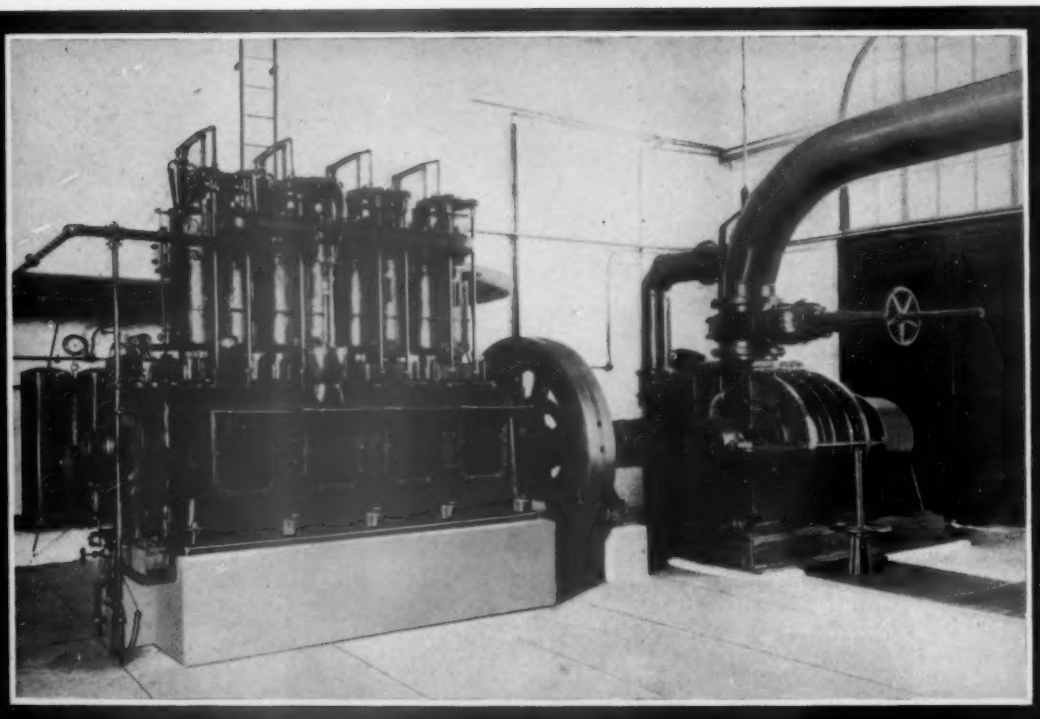

TO GIVE BETTER SERVICE
Gary chose the Vertical

THE Gary Heat Light and Water Company at Gary, Indiana had its customers in mind when it installed this engine, operated on manufactured gas. Ability to meet all service demands instantly and continuously was the first consideration. The second was economy. Installation and foundation costs were comparatively inexpensive. Enduring materials plus thorough engineering make the Vertical a "miser" on gas, oil and upkeep. Send for new Bulletin.

COOPER-BESSEMER

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AMERICAN PROVERS

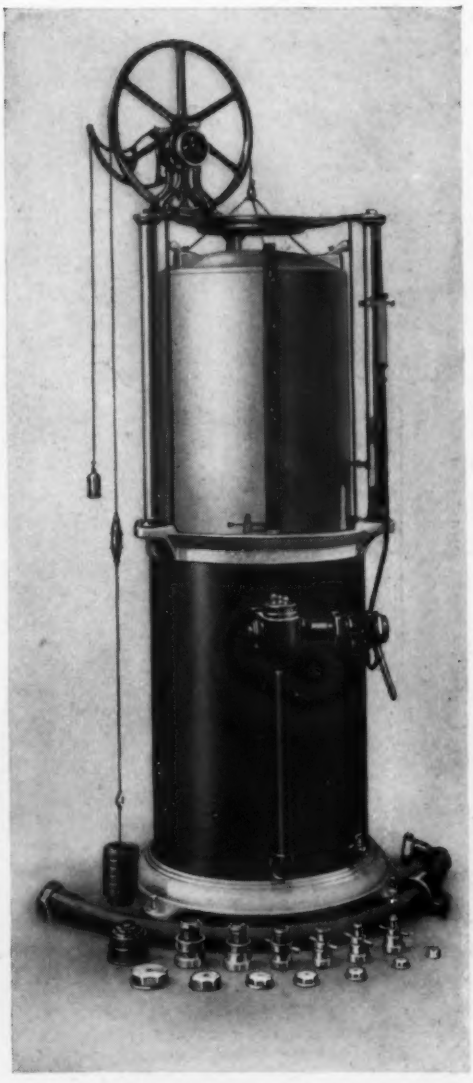
with OVER TWICE the former capacity

THE new American Provers — five foot, and ten foot — afford more than twice the capacity of the former type.

These improved models obviously enable larger meters to be proved at a rate equal to or in excess of rated capacities. Furthermore, advanced designing has greatly reduced the pressure loss at the meter inlet — an important improvement.

The new features include: (1) An increase in the airway diameter from the interior of the bell to the free end of the hose. (2) A larger dry well, hose and connection to conform to the increased area of the airway. (3) A handy gate valve. After a 2 years' exacting test in our own proving rooms this replaces the cock formerly used.

D. McDonald and Co. factory of American Meter Company, Headquarters for Apparatus, Albany, N. Y.



No.	Size	Capacity per hr. at 1½" pressure	
		FORMER TYPE	NEW TYPE
AL-13	5 ft.	950 cu. ft.	2250 cu. ft.
AL-14	10 ft.	1800 cu. ft.	5000 cu. ft.

Albany Research Laboratory of American Meter Company, specializing in low pressure measurement.

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The newer stoves and ranges call for steels of many kinds and of widely diversified characteristics. Yet there is a Republic steel to meet every requirement.

Cheap ranges use ordinary black steel sheets for oven lining. The better ranges specify Toncan Iron Oven Lining Sheets. Now Enduro, Republic's perfected stainless steel, is coming into use for this purpose, introducing a new standard of beauty, cleanliness and long life.

Enduro is sold only through Republic Sales Offices and Authorized Distributors.

The enameled stoves and ranges everywhere in evidence today owe much to the development of Toncan Iron enameling sheets—clean iron sheets of open surface character which take and hold tightly the decorative vitreous coating. And for bright or satin trim, Enduro stainless steel is unsurpassed—never changing—never tarnishing—kept clean by simply wiping.

Manufacturers who are modernizing their stoves and ranges should investigate Republic steels.

REPUBLIC STEEL
CORPORATION
GENERAL OFFICES: YOUNGSTOWN, OHIO

The Darling reporter asked . . .

"Do you find the simple construction of Darling Valves any advantage?"

"Yes, we do—because the simpler our equipment, the less trouble it causes."

In Darling Valves there are no ribs, guides, shoulders, corners and pockets to catch scale or sediment to cause the parts to jam and prevent efficient operation.

Long and satisfactory service is assured in great part by the sound mechanical construction with the revolving gate discs — an exclusive Darling feature. High quality Darval semi-steel metal and Dar-a-loy bronze trimmings—exacting workmanship, inspections and tests—are other important factors.

A Request will bring full particulars.

DARLING GATE VALVES

Darling Valve & Mfg. Co.

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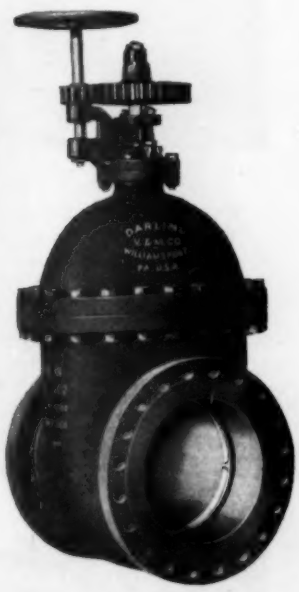
LOS ANGELES

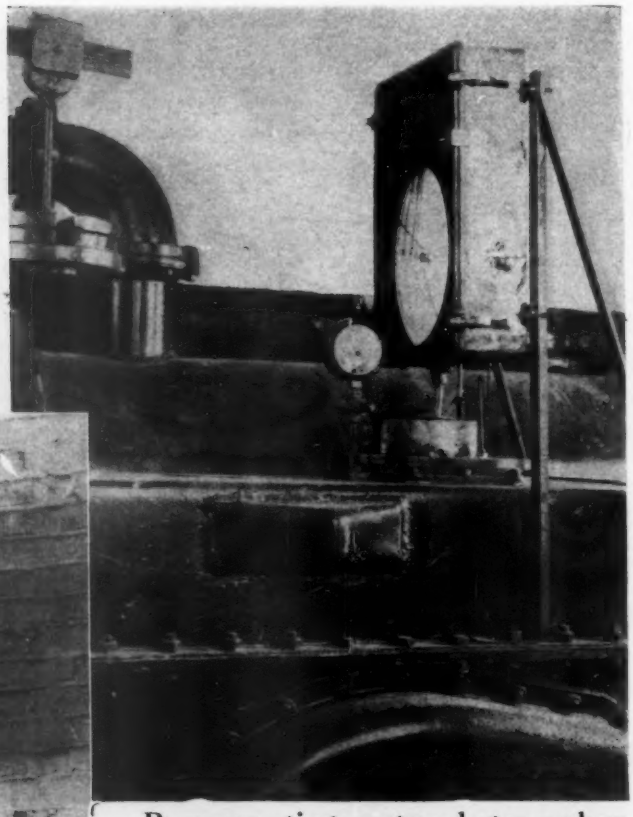
OKLAHOMA CITY
HOUSTON

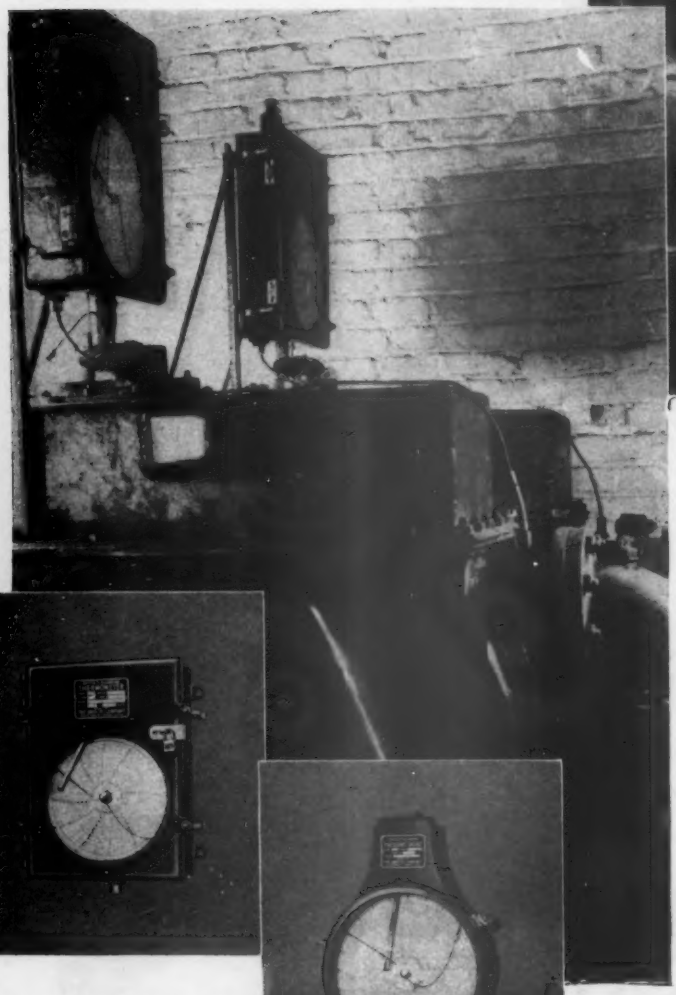
Darling Outside Screw and Yoke Semi-Steel Flanged End Gate Valve with companion flanges bolted on. Dar-a-loy trimmed.

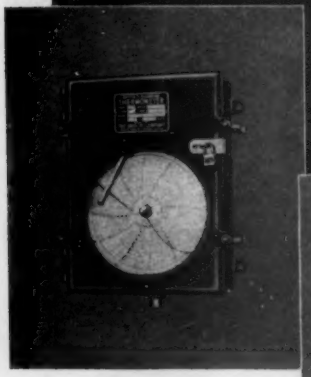
Darval Semi-Steel Gate Valve, Dar-a-loy trimmed — for natural gas pipe lines and compressor stations.



Cutting Down Metering Losses . . .







By correcting metered gas volume TO STANDARD CONDITIONS OF PRESSURE AND TEMPERATURE under direction of Bristol's Recording Pressure Gauges and Recording Thermometers.

Instruments recommended for this purpose can be furnished as separate units; or in combination —geared to the meter for use as a demand recorder.

Complete specifications, details of installation, etc., will be sent on request to any interested person. Or, if preferred, Bristol's Field Service Engineers will be pleased to consult at your convenience.

This engineering service is offered without obligation of any kind. Write THE BRISTOL COMPANY at Waterbury, or to Bristol's Branch Office nearest you.

Bristol's Recording Thermometer features moisture-proof, aluminum alloy case, inverted, chromium plated penarm. Uses 12-inch chart — 7-day or 24-hour rotation. Temperature range suggested zero to 120° F. 15 feet Bronze Armored Connecting Tube; Bulb No. 0337, with steel separable socket.

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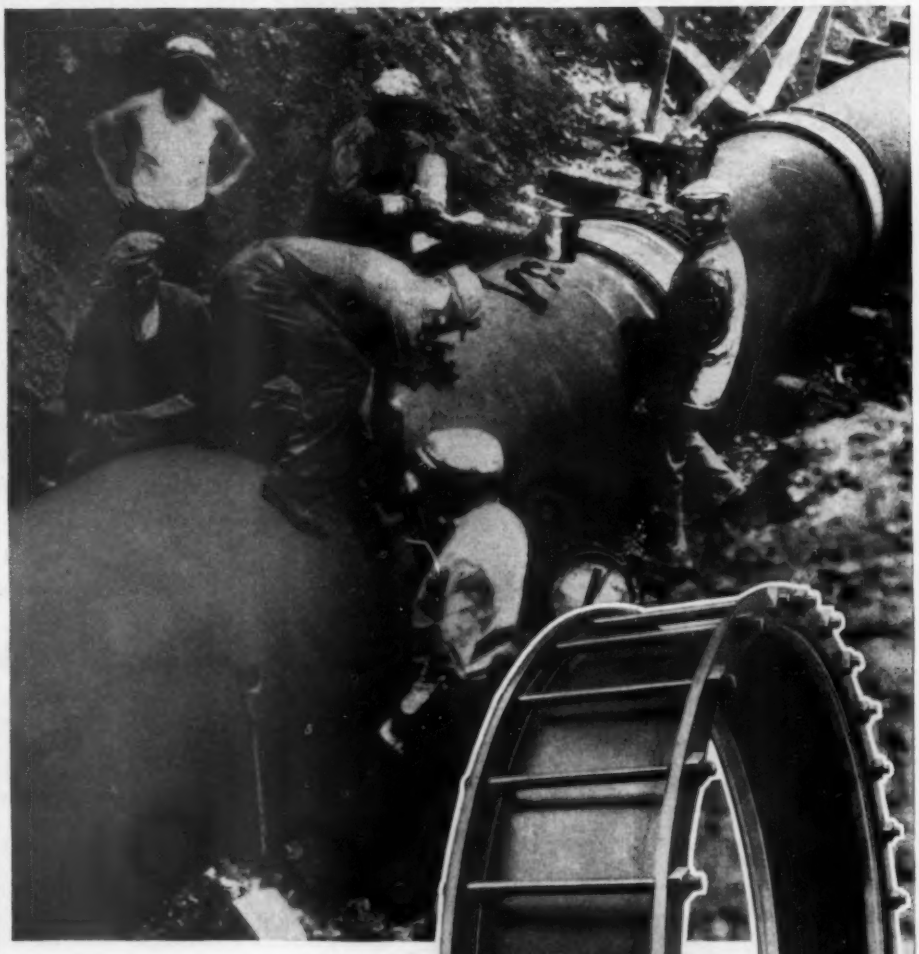
BRISTOL'S

SINCE 1889

Instruments for Indicating Recording Controlling

RIDING A BIG 'UN *with* DRESSERS



Dresser Couplings *simplify* the construction of large diameter pipe lines. They make the installation job easier and speed its completion.

DRESSER COUPLINGS DOMINATE

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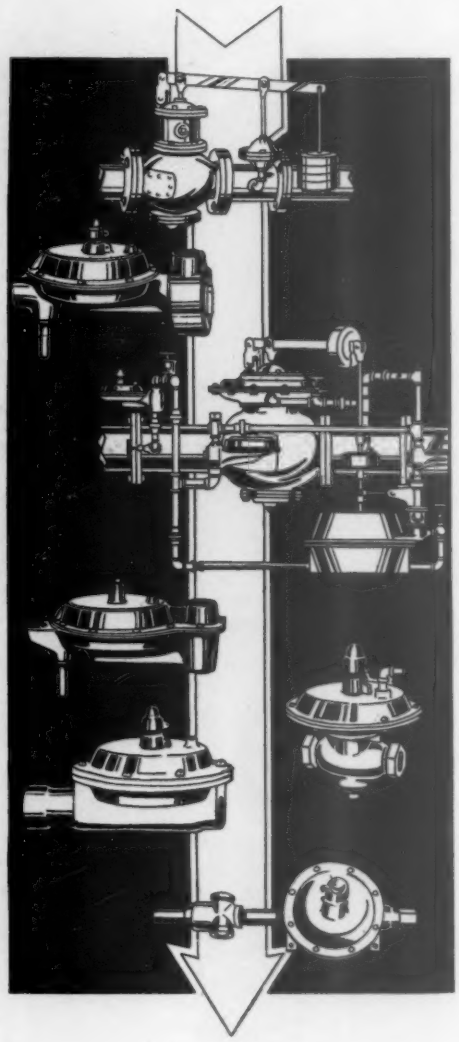
RIGHT down the line! From high pressure to low pressure, from 650 pounds down to 2 inches, on big jobs or little jobs, REYNOLDS Gas Control Regulators give accurate and dependable performance at a practical cost. Three outstanding characteristics of REYNOLDS installations are:

GAS CONTROL SINCE 1892



Factory Efficiency—While still in the production line, all parts of Reynolds Regulators are subject to close examination. After assembly every unit is tested for maximum operating performance. Records of these tests are placed in the factory files. Also, copies of these records are sent out with every job.

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Reynolds Products—for all kinds of Pressure Reductions . . . for either artificial or natural gas. GOVERNORS—Intermediate Pressure, Triplet Outlet, Holder, Toggle Type Street. REGULATORS—High Pressure Service, Low Pressure Service, Intermediate Pressure, High Pressure Line, Single and Double District Station. VALVE—Automatic Quick Closing Anti-Vacuum. SEALS—Mercury, Dead Weight.

REYNOLDS GAS REGULATOR COMPANY

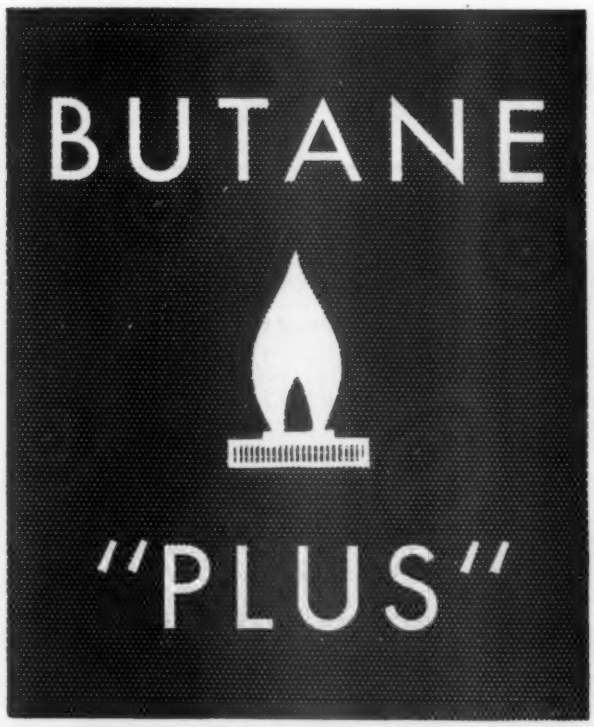
ANDERSON, INDIANA, U. S. A.

Branch Offices, 422 Dwight Building, Kansas City, Missouri

EASTERN SERVICE CO. Boston, Mass.

REPRESENTATIVES

F. E. NEWBERRY Avon, N. J.



The Leader of the Liquefied Petroleum Gas Industry Has **More** to Offer Butane Users » » »

PHILFUELS pioneering—years of research on liquefied petroleum gases and their utilization—its concentration on the perfection of manufacturing and transportation facilities *before* introducing these products to the Gas Industry—mean superiority in the quality and purity of Philfuels G-4 Butane and in the accompanying service.

A long discussion of Philfuels experiments, investigations and investments in this field would be of little interest to the user of Butane. But the resulting knowledge available is important.

No other organization can today match Philfuels' manufacturing and transportation facilities or its engineering experience in this field—matters of vital importance in the solution of operating and service problems.

Philfuels offers these *"plus"* factors to the Gas Industry. May we serve you?

Gas Manufacturing Division

« PHILFUELS COMPANY »

(Subsidiary of Phillips Petroleum Company)

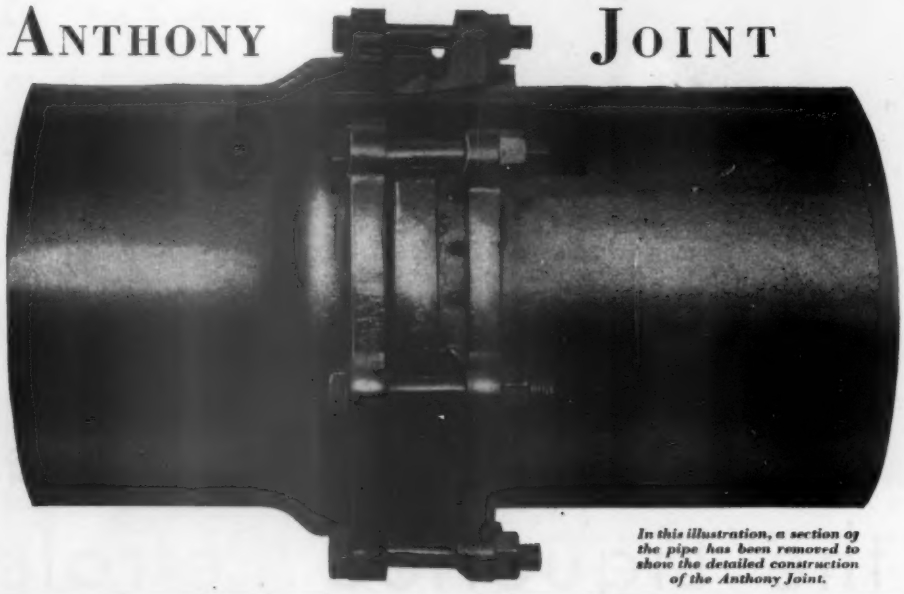
7-101 General Motors Building

DETROIT - MICHIGAN

For FAST *assembly . . .*

the

ANTHONY JOINT



In this illustration, a section of the pipe has been removed to show the detailed construction of the Anthony Joint.

only 3 easy operations

No longer do you have to bother with troublesome and exacting details to assure the tightness of a joint under high gas pressures. The Anthony Joint eliminates unnecessary delay, thus bringing about an appreciable saving in installation costs.

With the Anthony Joint, you merely put *one* gasket in place and bolt two rings together. Just three easy operations and there's a joint which will withstand high gas pressures 24 hours out of every day—without the sign of a leak.

The Anthony Joint allows for a surprising amount of deflection too. By using this joint, you can lay an absolutely leak-proof line in steep or rolling country.

The New Anthony Joint is offered in either deLavaud centrifugally cast pipe or in pit cast pipe and fittings. All rings, bolts and gaskets are interchangeable.

Of special interest is the fact that Anthony Joint bends, tees and other fittings can also be used with plain end pipe. These Anthony Joint fittings enable the contractor to make sure of the tightness of the important terminal points of his line. Ask us for complete information regarding the many advantages which this new joint offers.

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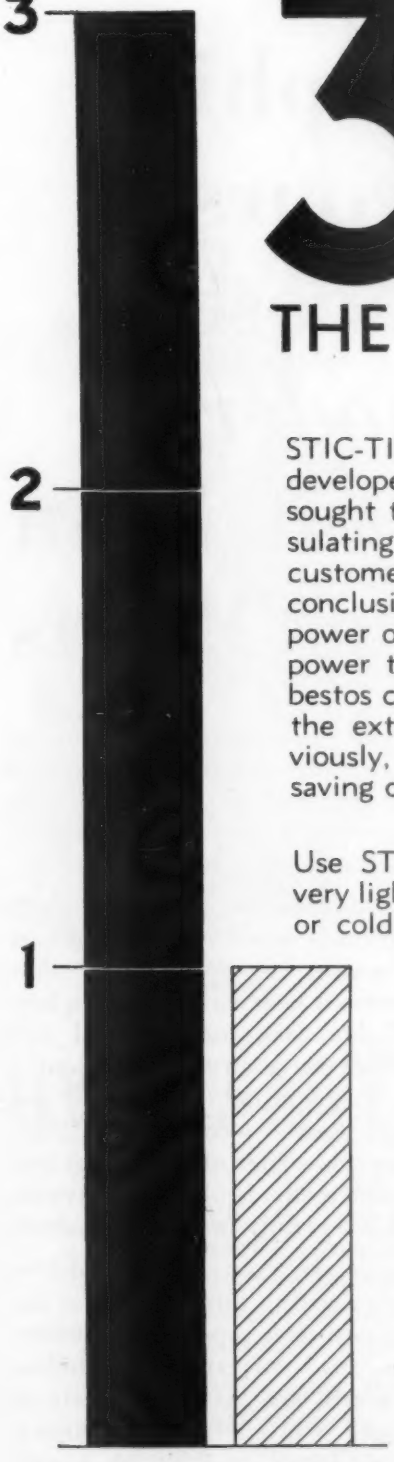


3 TIMES

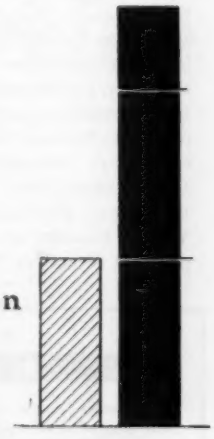
THE INSULATING POWER

STIC-TITE is a radically new kind of insulating cement, a material developed to attain the highest possible heat economies so urgently sought today. It is an unusual cement with tremendous heat insulating power. In many thorough tests, recognized authorities, customers' engineers, and our own engineering staff have proved conclusively that STIC-TITE has more than three times the insulating power of common asbestos cement. So remarkable is this insulating power that when equal thicknesses of STIC-TITE and common asbestos cement are placed side by side on any job you can actually feel the extra coolness of STIC-TITE with the palm of your hand. Obviously, scientific instruments will record a striking saving of B.t.u.

Use STIC-TITE in your plant. It is monolithic, very light in weight, sticks to any clean surface (hot or cold) and seldom if ever needs reinforcement. Applied in the same thickness, STIC-TITE covers more than two and one-half times the area per pound than can be covered with common asbestos cement. Naturally, it must cost less on any job. STIC-TITE is reclaimable too, you can use it over and over again and reap additional savings.

Use STIC-TITE in your plant, for economy if for no other reason.

More than 2½ Times the Coverage



Refractory & Engineering Corporation
50 Church St., New York, N. Y.
Warehouses in
Boston, Pittsburgh, Norfolk, Chicago, Baltimore, Philadelphia

R&E

Made by The Makers of R & E # 3000 MOLDIT and MOLDIT-A

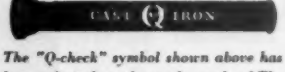
STIC-TITE

Modern Philadelphia of course chooses *modern* Cast Iron Gas Mains

Efficient mechanical joints for cast iron gas mains are now in use and obtainable for high-pressure gas distribution.

Cast iron pipe bearing the "Q-check" trade mark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York.

Reg. Trade Mark



The "Q-check" symbol shown above has been adopted as the trade mark of The Cast Iron Pipe Research Association.

With original cast iron gas mains as a constant reminder of long and economical service, it is not to be wondered that Philadelphia chooses cast iron gas mains today.

For, despite the remarkable service records made by old-time cast iron mains, engineers know that *modern* cast iron mains are even better. Today, laboratory control and scientific machinery bring about a high uniformity of quality not thought possible a century ago. Present-day knowledge of metallurgy and improved methods of casting have resulted in a greatly improved product.

Engineers, contractors and city officials desiring information on the use of cast iron pipe for gas, water, sewers, road culverts or for industrial needs, are invited to write to Thomas F. Wolfe, Research Engineer, The Cast Iron Pipe Research Association, 309 Peoples Gas Building, Chicago, Illinois.

CAST IRON PIPE

in Old Philadelphia

—cast iron gas mains laid in 1835 are *still in active service*

WHEN the State House flag-pole was at a "dizzy height"...when hansom cabs were the latest thing in urban transportation, and "burning the midnight oil" was frequently a fact . . . Philadelphia in 1835 put down its first gas mains—9000 ft. of cast iron pipe.

And today, some 1000 ft. of those self-same mains are still in active service. In a recent letter from the Philadelphia Gas Works Company we read as follows: "That part of the original line which is no longer in service was removed at various times between 1904 and 1930 because of changes in street lines, construction of subways and other operations, *none of which involve the strength or quality of the pipe proper.*"

TRENCH BEFORE NOON!

WITH its wide range of speeds quickly and easily accommodated to the conditions at hand, its extreme compactness, abundant dependable power and unequaled mobility, the Cleveland Baby Digger assures, on all distribution work, plenty of trench by noon—giving all the afternoon hours to lay and fill. This means less open trench over night, less public liability and danger of cave-ins.

In fact many gas companies find that the Baby Digger will open enough trench in three or four hours to supply their pipe laying gang with an ample day's work, and release the machine for service at other locations.

And the unexcelled ease of transportation of the Baby Digger on its own specially built trailer assures its reaching the next location with minimum time lost. It is a fact that in our largest cities the Baby Digger can be loaded on its own husky dual-wheeled, pneumatic tired trailer and transported by truck clear across town and unloaded again ready to work, in from one to two hours.

Under the old conditions of hand digging this efficiency and economy of trenching was unattainable. Certainly the Cleveland Baby Digger because of its compact design, ease and speed of operation, and exceptional mobility, has revolutionized trench digging, on all gas distribution jobs, giving more trench in more places at minimum costs. You can't afford to be without a Baby Digger.

Write today for Revised Catalog No. 10

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

20100 St. Clair Avenue Cleveland, Ohio

The CLEVELAND BABY DIGGER

Especially Designed for *Higher* Gas Pressures

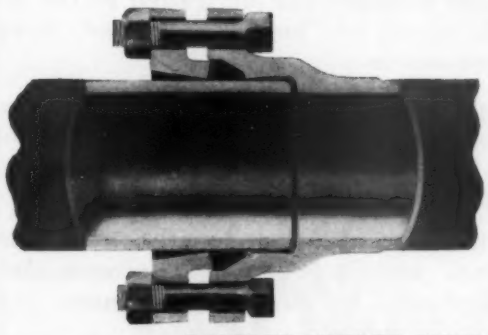
DOUBLEX SIMPLEX

centrifugal

CAST IRON PIPE

ACIPCO'S Doublex Simplex pipe introduces the permanence, dependability and laying economies of centrifugal cast iron pipe into high-pressure gas lines. Doublex Simplex is manufactured by the world-famous Mono-Cast centrifugal pipe process. Being cast under high centrifugal pressure, it is homogeneous throughout its entire length, fine grained, dense in structure and free from inclusions and casting strains. Composed of iron only one degree removed from its natural state, it is highly resistant to corrosion. Doublex Simplex pipe derives its name from the Doublex Simplex Joint with which it is equipped. This joint (an exclusive feature) employs the stuffing box and gland principle. The socket is integrally cast on one end of the pipe and terminates in a flange. The other end of the pipe has a plain spigot. An endless ring gasket is held under pressure in the triangular socket by means of a cast iron gland which loosely fits the spigot end of the pipe. The friction grip of the gasket against the surface of the pipe gives a tight joint against separation and leakage even at extreme high pressures. The size and bulk of the gasket allows unusual joint deflection and ample provision for expansion and contraction. A common laborer can make the joint with one tool—a ratchet wrench. Although a comparatively new addition to the Acipco line, Doublex Simplex high-pressure pipe is already in extensive use in gas lines throughout the country. A full line of cast iron fittings for every need is available. Write nearest Acipco office for specific literature, prices, etc.

Doublex Simplex Joint: when this laborer centers the spigot and tightens the bolts, the joint is complete! Leakproof, too!



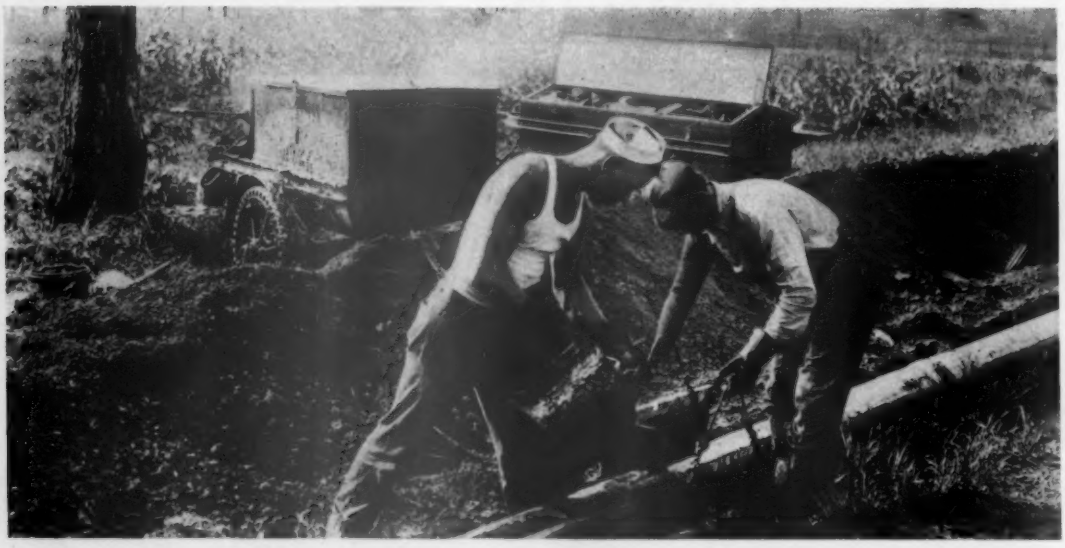
DOUBLEX SIMPLEX JOINT

AMERICAN CAST IRON PIPE COMPANY

Birmingham, Ala.

Branches: New York City, Chicago, Minneapolis, Kansas City, Cleveland, Detroit, Dallas, San Francisco, Los Angeles, Seattle

THEY CO-OPERATE IN CUTTING COSTS



A MOHAWK HOTSTUF HEATER AND A HI-SPEED TOOL TRAILER IN USE ON A LARGE GAS PIPE LINE JOB

Hotstuf

The bitumen heater with the Patented Elevated Melting Chamber Feature.
The hot material does not come in contact with the cold material, thus making it possible to load the cold material into the heater without lowering the temperature of the hot bitumen.
It gives continuous flow of hot bitumen in from 10 to 15 minutes after lighting the torch and continuous flow throughout the day.
The Hotstuf Heater has an efficiency of at least 30 percent greater than other makes.
Compare the melting capacity of this heater with that of other makes of the same holding capacity.
Made in convenient sizes to suit every job.

MOHAWK HI-SPEED TRAILER

The Mohawk Hi-Speed Tool Trailer is designed to meet the most exacting needs of the gas main department and pipe line contractor.

Tools and supplies can be trailed to the job at truck speeds and locked up for safe keeping when not in use.

They are built to stand the most severe use, all steel, mounted on 3 inch channel iron frame, half elliptic springs, rubber tires and roller bearings.

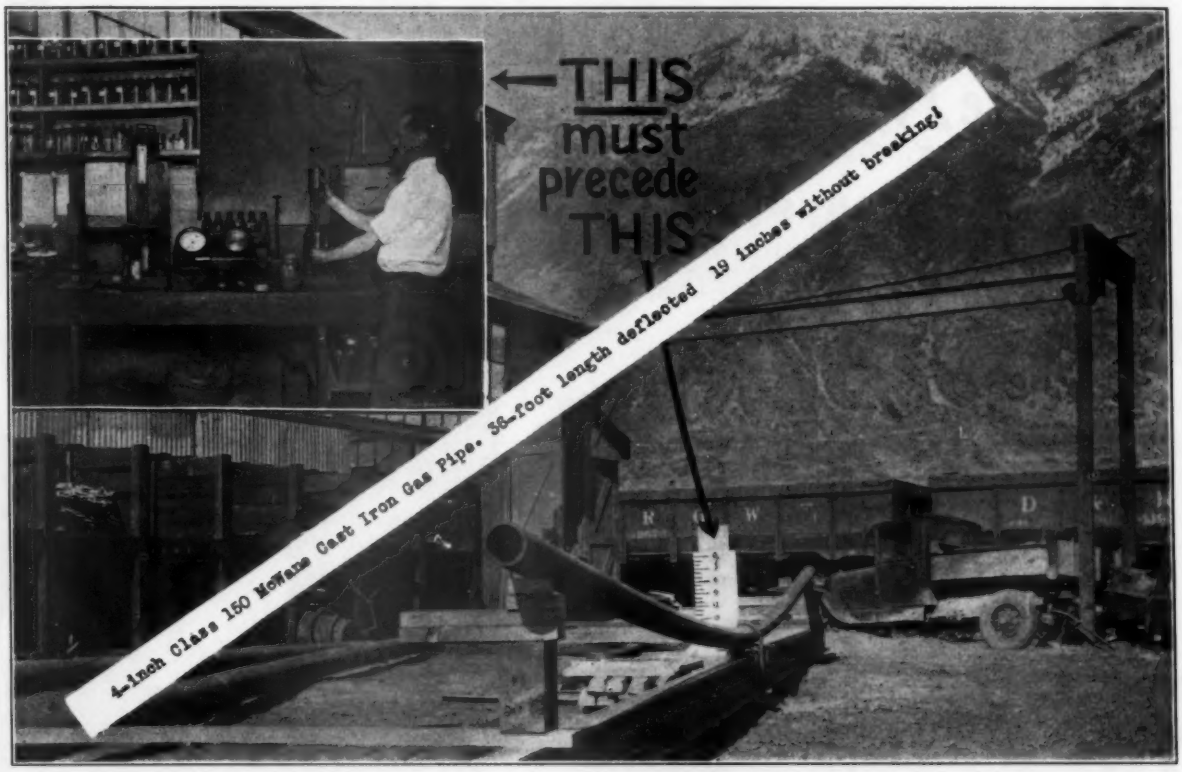
Made in 6, 7 and 8 foot lengths, with compartments and brackets to accommodate every tool used by the gas department.

Special sizes made to suit your specifications.

Write for Catalogue and Prices

MOHAWK ASPHALT HEATER CO.

SCHENECTADY NEW YORK



McWANE EXCELLENCE IS NO ACCIDENT

Even the sand with which McWane cast iron gas pipe is made is tested! Step by step, laboratories and foundries work together with the raw materials, from pig iron to finished pipe. Test after test checks the product, assures perfection in the pipe.

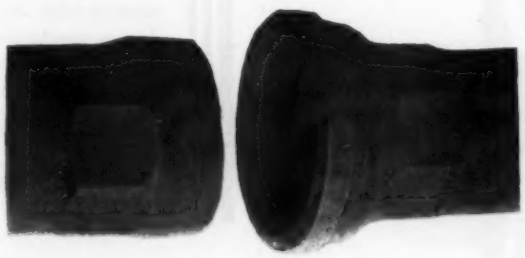
Until YOU are assured a smooth, straight, sturdy pipe—SAND CAST, yet combining "The best of the old with the best of the new." Modern in weights, strengths, and accuracy—old-fashioned in the way it cuts, taps, and ships.

SMALL SIZES FOR HIGH PRESSURES

McWane gas pipe is cast as small as 1¼ and 2 inches. This, with the McWane types of high-pressure joints, permits rust-proof cast iron pipe for small mains and services. No coating or coddling needed then.

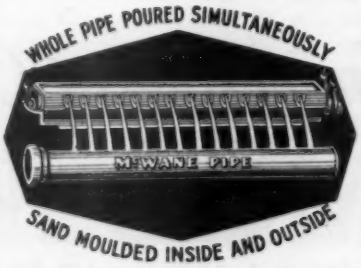
LEAKPROOF JOINTS

McWane Flexpan Joints take care of expansion and contraction; McWane recess-threaded joints (shown below—no couplings) make gas pipe laying swift and simple, Both hold the gas. Also furnished B. & S., plain ends, etc.



McWane Pipe sizes 1¼ thru 12 inches. Standard lengths. Fittings. Investigate.

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA



PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

208 S. La Salle Street CHICAGO — 149 W. 2nd South Street SALT LAKE CITY — 1807 Santa Fe Bldg. DALLAS — 111 Sutter Street SAN FRANCISCO — 417 S. Hill Street LOS ANGELES

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Use *Tycos* Recording Thermometers for Accurate Temperature Readings

TYCOS Recording Thermometers have a long-standing reputation for accuracy. They have been specified on hundreds of applications in those industries where correct readings are considered most important.

Now Tycos Recording Thermometers offer a new standard of accuracy . . . super-accuracy . . . due to the new Tycos Compensated Tubing, which automatically corrects for any temperature change around the tubing itself. Lengthy tubing may pass over steam lines, refrigerated coils or run outside where it is subject to weather and seasonal changes . . . the accuracy of the Tycos Recorder is unaffected.

Tycos Compensated Tubing is greatly superior to other compensation systems which depend for their action on springs and levers and are subject to mechanical failures. Tycos Compensation is *built into the tubing* and corrects for temperature change at any point.

For Accuracy . . . specify Tycos Recording Thermometers on all your gas plant installations. For accuracy-plus, specify also Tycos Compensated Tubing.

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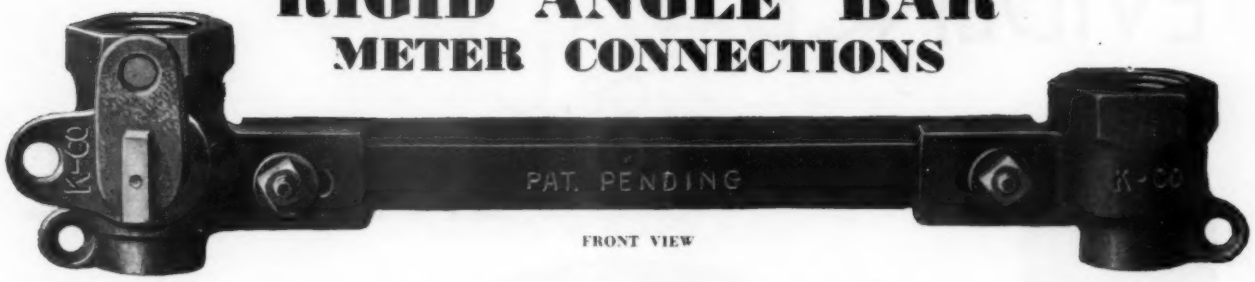
KITSON
RIGID ANGLE BAR
METER CONNECTIONS



FRONT VIEW

With Built-In Lock Wing Stop Cock

Use Meter Connections for Meter tie-up. This method eliminates extra fittings, provides support for the meter and makes a first-class installation job.

This adjustable three-piece connection does not require unions, and the stiff angle bar gives rigidity with neat appearance. It has been adopted by some of the largest gas companies and is being used on all sizes of meter installations.

REAR VIEW

The various sizes and styles of Connections and Meters for same as follows:

K-0— ¾ x ½" with built-in Stop Cock and 9" Bar for 5 A Meter
K-1—1 x ½" with built-in Stop Cock and 9" Bar for 5 A Meter
K-2—1 x ¾" with built-in Stop Cock and 10" Bar for 10 LT Meter
K-3—1¼ x ¾" with built-in Stop Cock and 10" Bar for 10 A Meter
K-4—1¼ x 1 " with built-in Stop Cock and 12" Bar for 20 LT Meter
K-5—2 x 1¼" with built-in Stop Cock and 14" Bar for 30 A Meter

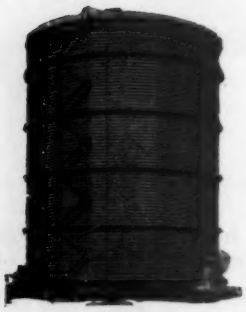
Without Built-In Stop Cock

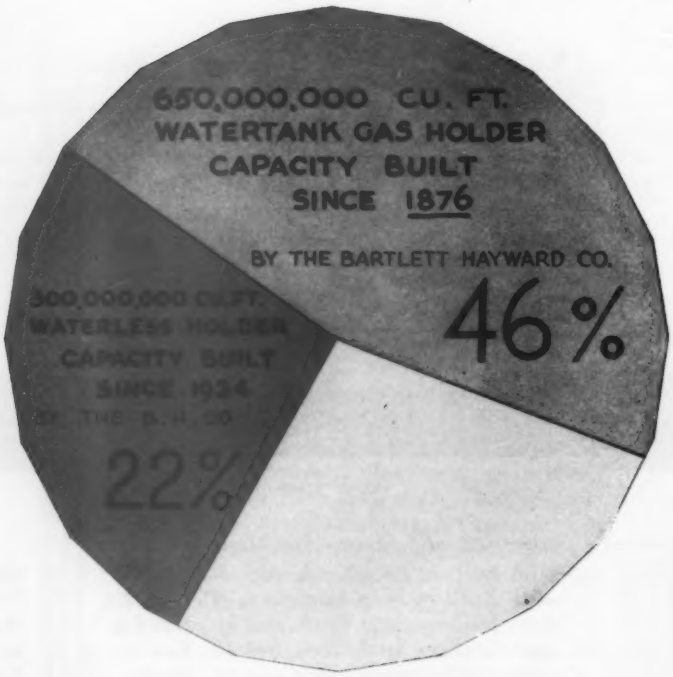
The various sizes and styles of Connections and Meters for same are as follows:

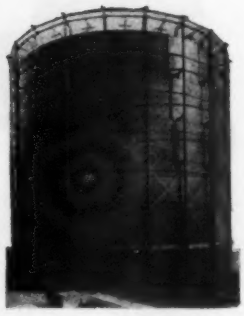
L-0— ¾ x ½" Meter Connection with 9" Bar for 5 A Meter
L-1—1 x ½" Meter Connection with 9" Bar for 5 A Meter
L-2—1 x ¾" Meter Connection with 10" Bar for 10 LT Meter
L-3—1¼ x ¾" Meter Connection with 10" Bar for 10 A Meter
L-4—1¼ x 1 " Meter Connection with 12" Bar for 20 LT Meter
L-5—2 x 1¼" Meter Connection with 14" Bar for 30 A Meter

KITSON COMPANY
PHILADELPHIA

EVIDENCE OF EMINENCE







68 PER CENT BY BARTLETT HAYWARD

This circle represents approximately 1,400,000,000 cu. ft. of Gas Holder Capacity in service in the United States.
(According to U. S. Dep't Commerce)

The Bartlett Hayward Company has erected since 1876 approximately 950,000,000 cu. ft. including approximately 300,000,000 cu. ft. Waterless Holder capacity ranging in sizes from 500,000 to 20,000,000 cubic feet.

Coal Gas Plants
Carburetted Water Gas Plants
Blue Water Gas Plants
By-Product Plants
DeBrouwer Charging and Discharging Machines
Salt Water and Fresh Water Condensers
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Gas Holders

THE BARTLETT HAYWARD COMPANY
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Purifiers
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Fast's Flexible Couplings

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Manufactured and Natural Gas

HENRY M. RILEY, *Editor*

Natural Gas Treasure

PROFESSOR DOBIE in his recent book, *Coronado's Children*, writes interestingly of the numerous efforts to unearth gold and other treasures—alleged to have been buried in Texas and other parts of the Southwest—from the days of the earliest Spanish settlers up to the present time. Of greater economic value, however, are the increasing number of natural gas wells that have been brought in in this self-same territory in the past few years and, from the romantic angle alone, the gas wells in the San Angelo district, the deepest wells of any kind yet sunk into the earth, are vastly more intriguing than the efforts of the credulous chasers after the will-o-the-wisp gold.

Viewing the matter from the mathematical angle, it is highly likely that the summated delvings into the earth's surface by the men mentioned in Dobie's book would have accounted for a score or more of wells, each going to a much greater depth than one mile and a half.

The striking feature about the deep wells of the San Angelo district is that it would seem to indicate that the productive life of waning natural gas wells can in many instances be lengthened by sinking them deeper into the earth's surface, thereby reassuring those that might entertain an opinion that natural gas will play out in a relatively short space of time.

It is further worth mentioning that although the utility man is primarily interested in matters pertaining to the marketing of the gas within an area served by his distribution system, he still should keep posted as to the continuity of gas supplied by the pipe line company and its longevity—and this applies not only to the neutral gas utility man but also to the manufactured gas operator.

A knowledge of such matters obviously strengthens the natural gas man and at the same time broadens the intellectual vista of the manufactured gas man to the end that his transition from manufactured to natural gas operation can be effected with facility in the event of a change-over.

There might perhaps be more drama in haphazardly pock-marking the earth's surface, in an effort to uncover doubtful caches, than there is in sinking a well a mile and a half into the ground for natural gas, but the latter undertaking is most assuredly infinitely more conducive to the advancement of mankind—in itself no mean piece of drama.

By-product Chemicals From Water-gas Plants

FOR two or three years a sub-committee in the technical section of the American Gas Association studied the possibility of water-gas usage in the making of chemicals. At that time it looked as though the most promising of such byproducts was methanol, a chemical which can be readily made by catalytic processes direct from mixtures of carbon monoxide and hydrogen. The interest to the gas man was, of course, in the use of off-peak water-gas capacity for the purpose of producing chemicals from this gas during seasons when the fuel requirements of the interested units was at a minimum.

Fortunately, the gas industry did not enter into that particular type of enterprise. Recent developments show how unwise such a venture would have been. Synthetic methanol is now being made in very large quantities and further, almost indefinite, expansion of chemical production seems possible. The only limitation on the further development appears to be the market demand for the chemical. The price for methanol dropped during 1930 by approximately 20 per cent and further price declines are in prospect.

In quite a number of related fields gas men have looked enviously upon chemical markets for potential byproducts. Naturally such markets should be seized whenever they can be reached by sound economic developments. However, the methanol experience of the past two years shows how conservative the industry must be when entering into fields of chemical manufacture where competition with larger enterprises of distinctly chemical nature is likely to follow. In ammonia and tar products the gas industry already has a sufficient number of problems so that it should not lightly take on more merely through a desire to expand the variety of its byproducts.

Dump Gas For Power Plants

THE CONTINUED drought throughout the United States clearly forecasts a low run-off during the coming season. Even if the precipitation should return to normal very soon it is doubtful whether the stream flow during the coming summer could be restored to normal proportions in most parts of the United States. The prospect, therefore, is for limited water supply, especially at many hydroelectric properties.

This certainty of low water supply offers some possibility of advantage to the gas industry. It suggests possibility of increased use of summer surpluses of gas in central-station steam-power plants. Already the statistics for fuel consumption at such plants shows that natural gas is now being used more than ever before for steam generation. It is possible that during the coming summer the load on gas-transmission lines may be materially augmented by securing certain dump gas customers in the electric-utility field. It will be particularly fortunate if this arrangement for getting a better load factor on gas-transmission systems can be developed. Managements will do well to investigate it for all the territory in which they are interested so that the earliest practicable application of the possibility will be secured.

Employee Turnover

THE gas industry in common with many other businesses yearly experiences, it would seem, too great a turnover of its employees who might be listed in the class of brain workers. In this connection, particular reference is made to the higher grade of these brain workers, namely the college and technically educated employee. On this assumption it is obvious that a careful study of the situation is more or less imperative. When we consider the number of years the man in the class referred to has spent in college,—the expense of which is all borne indirectly by industry,—and the time the company by whom he is employed has expended in training him, it can be seen that there is involved no inconsiderable investment which for the summated whole might easily run into many millions of dollars.

The question might very well be asked, why is there such a high mortality among these men; just why do they change their jobs? In answer, the following suggested reasons are enumerated:

General spirit of restlessness
Higher pay in a new job
Idea that the new job holds a better future
Dissatisfaction with work or associates
Discharge due to one or more reasons

If any betterment in turnover is to be effected, clearly the items listed above will demand careful study on the part of the management, and not spasmodically but at regular intervals. In other words, say at least once a year the higher officials and the personnel or employment manager should very carefully study the cases of the type of men under consideration who have left their company's employ—and they should not be satisfied until they have all the facts in the matter.

In considering the reasons advanced as to why men change their positions the first, the spirit of restlessness, can be dismissed without comment. The second item, wherein a man feels that he has made a change for higher pay, is somewhat difficult to counteract. However, one solution might lie in the direction of the

management definitely demonstrating to the man that it will only be a matter of a short time before his own company is paying him more money, such argument being backed up by actual statement as to how certain definite individuals in the company have gotten ahead financially. In the case of where the man feels that the new job he is taking holds a better future, strenuous salesmanship, so to speak, is required. In other words, if the higherups are good enough salesmen they will have no difficulty in selling the man in question the idea that his present company offers opportunities which should be quite adequate. This statement is based on the fact that few if any other industries offer opportunities equal to those to be found in the gas industry.

Don't keep your nose in the book too long; do some outside work

In the case where the employee is leaving due to dissatisfaction with his work or associates or where he has been out-and-out discharged, team work and cooperation of the very highest sort must be employed. Frequently, dissatisfaction with his work or associates on the part of an individual can be traced to indulgence in petty company politics, which certainly have no place in modern business. Accordingly, employees would do well to steer clear of corrider and wash-room gossip which might seem derogatory to the company's policy or harmful to certain individuals. In this connection the employee himself should frequently be reminded of the evils of such procedure; after all, he himself can only effect any cure in this connection.

One of the greatest helps to allay dissatisfaction is the reasonably rapid rotation of the man in various jobs. This is not only beneficial from the angle stated, but clearly supplies the man with a great fund of knowledge which can be applied advantageously to the company and himself, later on in his career. We have often felt that if various departments would regularly hold meetings of their key men, where each man would be given the floor to freely air his grievances, without detriment to himself of course, a great deal of good could be accomplished and petty politics would soon pass entirely into the discard.

Not infrequently an employee's general physical status makes him an easy mark for some of the ills mentioned and here a periodical compulsory medical and dental examination would surely work wonders. Other items which would assure the paring down of high grade employee turn-over, would be the institution of pension systems, sick benefits, encouragement of employees to buy stock in his company and the institution of club and similar company organizations which would stress solely the recreation aspect. In other words, such features would tend to make the employees job unusually attractive from a number of angles.

It is felt that there is no real valid reason why high grade employee turn-over should be as great as it is at the present time and an honest investigation of the situation should lead to a quick way out of the difficulty.

We cannot afford to lag in this regard.

New Gas Wells

THE RECENT bringing in of large volume natural gas wells in the Oneida and Utica areas of New York State can be depended upon to boost land values and cause much prolix discussion in the newspapers. In addition, through various agencies, the whole problem as to the proper disposition of this gas will be solved (?) well in advance for the gas companies who might eventually use it. If we could only half-way believe this latter statement we could indeed consider that we had arrived at Utopia.

Fortunately for the gas using public, the final disposition of this recent contribution of nature will be settled by a careful engineering and economic study of all the facts in the case, and by competent gas men in the various utilities themselves. This cannot be accomplished over night and hence, it would seem to be quite out of order and indeed somewhat visionary for gas company customers to be led to believe that they will soon be enjoying the blessings of their old friend gas at prices which are ridiculous on the face.

Gas from A Mile and A Half Below the Earth's Surface

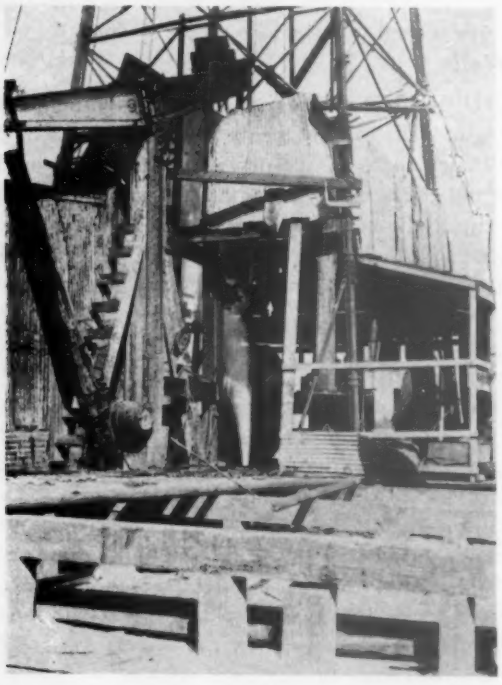
MILLARD COPE

NATURAL gas from the world's deepest wells, in Reagan County, Texas, soon is to be piped 80 miles to supply the commercial and domestic needs of San Angelo, a city of 30,000 persons. While lines are being laid to San Angelo, another is to go west to the Pecos River, 50 miles away, to supply the plant of the Pecos Valley Power and Light Company, which supplies power for drilling and pumping of oil wells in the Yates field region.

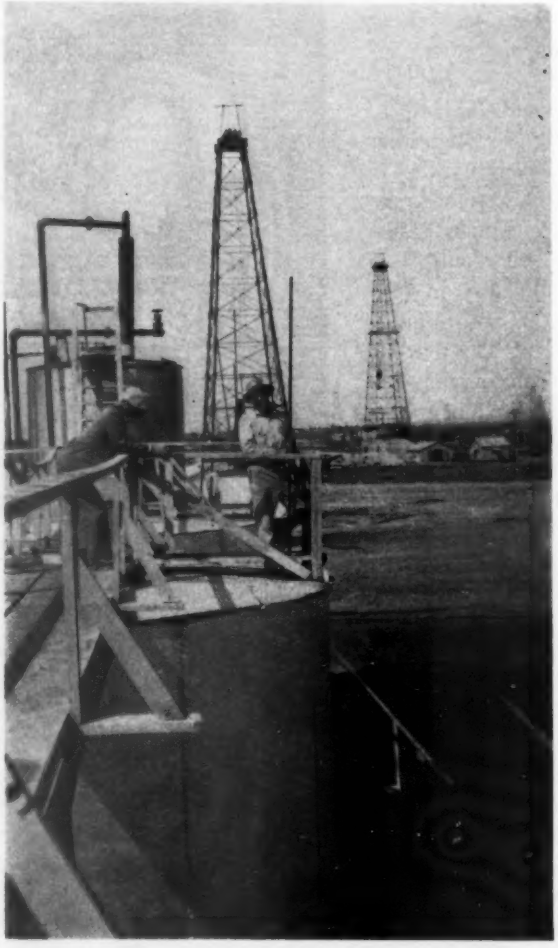
The gas is coming from 8,525 feet below the surface of the earth—more than a mile and a half deep; the discovery well of a group of eight now producing from that depth. Three of the wells, including the discovery producer, have a total daily gas production of 72,000,000 cubic feet and the other five have a daily total production of 93,000,000 cubic feet.

Conservation Ordered

Some time back the State Railroad Commission had ordered the wells shut in until properly tubed or a market provided for excess gas used in the production of oil "so as to conserve and prevent all waste gas from escaping from said wells." At the same time the commission ordered that all new wells be properly tubed before being brought in.



Deepest well blowing in



Deepest well in background of tanks in which oil is stored

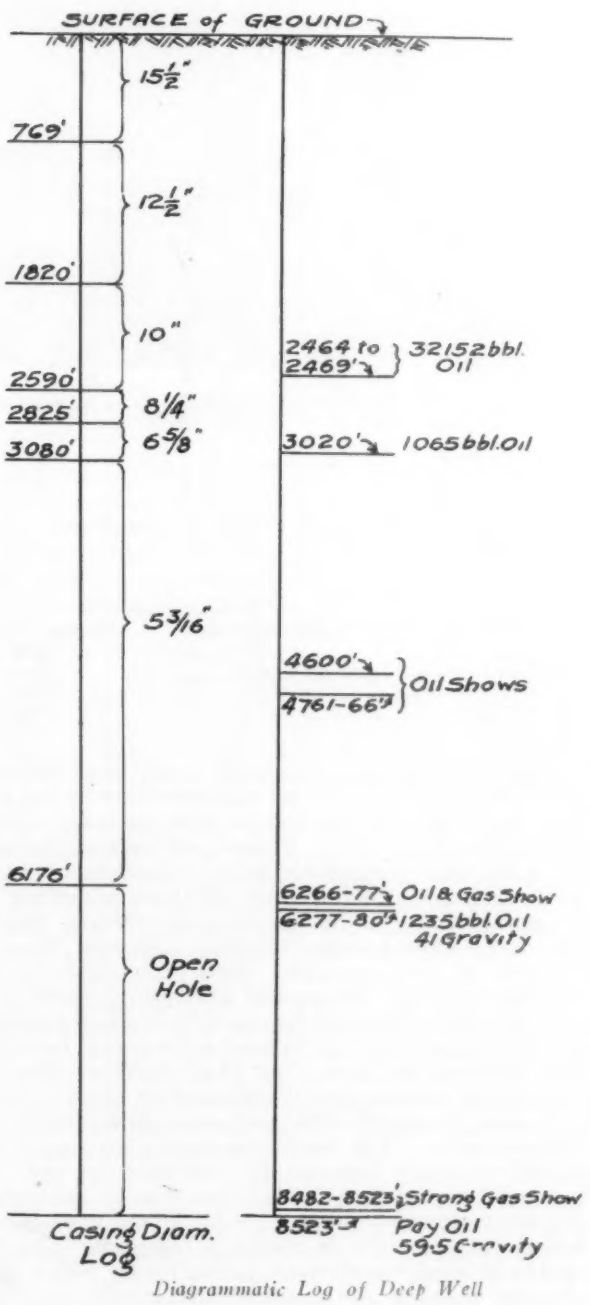
Without attempting to determine how much gas had been wasted in producing from the deep pay, the Commission found that more than thirty billion cubic feet of natural gas had been produced since the first well was brought in, "a large part of which was unlawfully wasted." The market value of the gas, figured in heat units, would equal $5,000,000, the commission found.

In addition to such enormous waste, the Commission also found a waste in underground oil due to the exhaustion of natural gas, the motive power for the propulsion of the oil from the sands, as well as a waste due to storage of oil.

"It is evident and necessary," the state body found, "that the Commission must take steps for the conservation of these great natural resources as are now being profligately and wastefully produced from the deep pay horizon."

The Commission estimated that if the wasted natural gas had been piped to all the homes in Texas it would

have been of sufficient quantity to supply them for approximately a year.



Diagrammatic Log of Deep Well

The companies announced immediately that tubing had been ordered for the wells, though officials of the concern were doubtful as to whether it could be used to an advantage at such a depth.

Regulating Production

Regulation of pressure has resulted in cutting production of the deep wells, a decline having been noted for the third consecutive week ending March 1. Oil production of the eight wells is approximately 130,000 barrels of 59.5 gravity oil, while gas production amounts to approximately 125,000,000 cubic feet daily.

The total drilling time of the discovery well was 1,030 days, 870 of which were spent in working. Work was suspended during 160 days. Drilling time is classified as follows: Days drilling, 394; fishing and drilling by, 160; reaming, 56; building rig, 17; rigging up, 30; running casing, 10; cementing casing, 4; pulling casing, 24; waiting on cement, 10; drilling cement, 18; cleaning out, bailing and swabbing, 42; repairing, 20; unclassified, 85.

There is no casing set below the 6,176-foot mark, where $5\frac{3}{16}$ pipe was set, the gas and oil coming up an open hole. Fifteen and a half-inch casing was set at 769 feet; 12½ at 1,820 feet; 10 at 2,590 feet; 8¼ at 2,825; 6⅝ at 3,080 and $5\frac{3}{16}$ at 6,176.

On December 4, 1928, the discovery well came in. Described on the driller's log, it is recorded: "No hole made. Gas increasing. Drillings gum up boiler. Gas pressure too great to bail. Gas increase. Can't get tools in hole. Gas increase."

The total cost of drilling the well is set at $16.60 a foot, which aggregates $141,500.54 for drilling the producer. Labor costs have been set at $51,040.86, or $6 a foot, the other costs being classed as miscellaneous.

While the well was drilled at a tremendous cost, it is producing approximately 25,000,000 cubic feet of gas daily, as well as approximately 3,000 barrels of high gravity oil, which brought in more than a million dollars during its first year in operation.

Why Well Was Deepened

Generally it is believed that the well was drilled to its record depth because of failure to get production higher, coupled with the fact that the company was determined to get production, but this was not the case. The well was drilled in a proven oil and gas field, on land owned by the University of Texas, to which royalties of approximately $15,000,000 have been paid; placing the University in a position, potentially, to become the world's richest endowed institution.

The well became a producer at 2,464-69 feet, producing 32,152 barrels of oil from that depth.

"Let's deepen it," suggested Carl Cromwell, drilling superintendent; "I'd like to know what's under there."

His suggestion was adopted. At 3,020 feet another oil producing horizon was encountered. From it 1,065 barrels of oil were produced. He continued drilling operations. Oil shows were obtained at 4,600 and 4,761-66 feet, and an oil and gas show was encountered at 6,266-77 feet. While none of the shows proved to be commercial production, a third oil pay was hit at 6,277-80 feet, from which 1,235 barrels of 41 gravity oil was produced.

With the gravity of oil growing higher the farther the drill bit went, Cromwell continued operations. A strong gas show was encountered at 8,482 to 8,523 feet. At the same depth, 8,523 feet, oil was struck for a fourth time, the pay being of 59.5 gravity. So highly refined is the product that it can be used instead of gasoline in operating an automobile.

After conferences with officials of the company, Cromwell decided to halt operations at 8,500 feet and plug back to the best producing horizon. Drilling had continued for more than 2,000 feet and if oil was to be encountered it should have been found by that time. All was set to suspend operations, only Cromwell forgot to notify the drillers. They continued and 23 feet deeper penetrated the world's deepest known oil and gas reservoir.

With a supply of more than 125,000,000 cubic feet of gas daily from these wells, and with numerous locations yet to be drilled, San Angelo feels that it is guaranteed a gas supply for years to come.

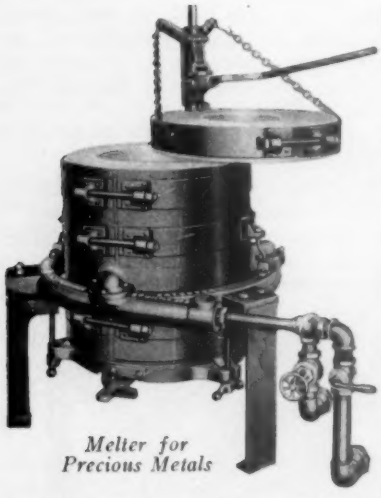
(Continued on page 261)

Industrial Furnaces For Gas

II Crucible Furnaces

LAWRENCE E. BIEMILLER

Supervisor Fuel Sales, Consolidated Gas Electric Light and Power Company.



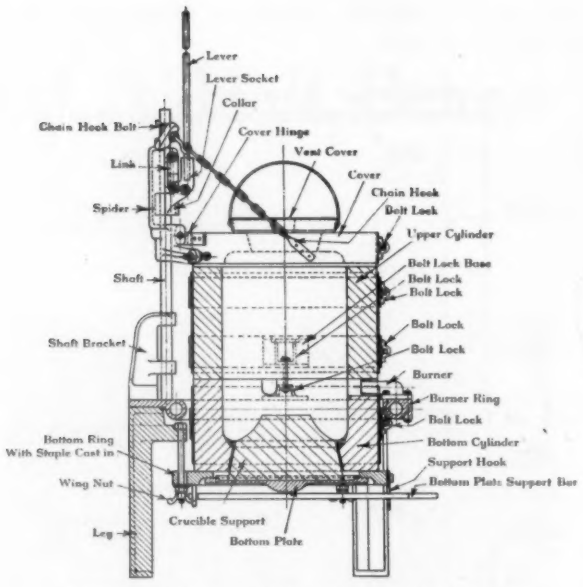
Melter for Precious Metals

THIS article is devoted to a consideration of furnaces with crucibles, mainly those using graphite crucibles. These furnaces differ from the metal pot furnaces described in Part I in that they are to operate at very much higher temperatures. They are used for the melting of brass, copper, gold, nickel, monel, and kindred metals, whose high melting points are shown in the following tabulation:

	Temperatures—°F		
	Melting Point	Boiling Point	Normal* Pouring Point
Brass:			
90% copper 10% zinc	1910	2730	2180
80% copper 20% zinc	1830	2330	2100
70% copper 30% zinc	1720	2090	1990
60% copper 40% zinc	1620	1960	1890
Copper	1981	4190	2250
Gold	1945		
Nickel	2646		
Silver	1761		

* Varies with the size and shape of castings.

Some of the metals which may be components of brass mixtures have very much lower melting points. The most important one—zinc, also has a very low boiling point.



Sectional View of Melter for Precious Metals

	Temperatures—°F	
	Melting Point	Boiling Point
Tin	450	4120
Lead	620	2780
Zinc	786	1700
Antimony	1166	2420

Because of the temperatures involved, these furnaces are well insulated. They are supplied either by gas at a high pressure, or by gas and air with the latter usually at one pound pressure. Proportional mixing burners are to be desired, especially where manufactured gas is used. Crucible and refractory life become matters of great importance, as they may be a considerable item in the total melting cost. Graphite crucibles have a capacity of four pounds of brass per number (a 60 crucible will hold 240 pounds of brass). There is a very important industrial heating field in which gas fired crucible furnaces should be used. To secure their use it is necessary to know their characteristics, those of competitive furnaces, and the places best suited to each.

A metal is usually heated well above its melting point before pouring. The smaller the casting the greater the spread necessary between the melting point and the pouring temperature. On the other hand if too high a pouring temperature is used the metal loss is excessive and the grain growth on cooling is too great. The desirable pouring temperature is the lowest which will give the soundest and toughest casting with the least rejects.

Stationary Furnaces for Precious Metals and Brass

One important metal melting operation, particularly in certain centers of the jewelry trade, is the melting of precious metals. This melting operation is particularly adaptable to gas fuel because of the cleanliness and convenience of this fuel, and the small fraction of the total manufacturing cost due to the fuel. The furnaces are made in a wide variety of sizes, from that containing a 0000 black lead crucible which holds 4 pounds of gold, to that containing a 100 crucible which holds 616 pounds of gold.

Because of the temperature required, the furnaces require a pressure combustion system such as that utilizing

Installation of Stationary Crucible Brass Furnace

gas at a few inches and air at 1 pound pressure. A number of burners are used, and the furnace design provides for locating them so as to give even heat distribution and at the same time result in long furnace life. Since the metal melted is so valuable, this type furnace is often provided with a "dip crucible" built in under the main crucible, so as to catch the molten metal in event of breakage of the latter.

In some of the larger sizes Sil-O-Cel insulation, carborundum and refractory brick are used. But in the smaller furnaces, the greater heat loss of an uninsulated furnace is preferred because of the longer refractory life and lower cost of lining replacement which accompanies it.

The gas consumption on furnaces of this type will approximate 1500 B.t.u. per pound of gold melted. The same type of furnace, with or without slight modification is used to smelt enamel frit in small quantities, for ash fusions, and for assay work. Automatic temperature control is not often used in connection with these furnaces.

Only slightly different from these are the stationary crucible furnaces used for brass melting. They do not have dip crucibles, and usually have only a small number of burners. They are made in sizes to accommodate crucibles from size 30 to 200, though the most usual sizes have about a 60 or 80 crucible. The combustion systems use either air and gas under pressure or high pressure gas, and are preferably proportional mixing. These furnaces have rugged lifting mechanisms for removing the cover, though the cover itself has a hole large enough to permit filling the crucible through it. The refractory will either be very good grade moulded hard burned fire clay or perhaps of chrome brick. Insulation, if used, will not exceed one inch in thickness, because of the desire for a long refractory life. Recently experimental work has been done upon the use of silmanite shapes and we may expect further development of this use of very specialized refractories.

The crucibles now used are of clay or graphite, but we may expect developments in the use of special refractories for this purpose. The average crucible now lasts from 40 to 100 heats, and crucible cost is a considerable item of melting cost.

This type of furnace is particularly adapted to the melting of brasses of high boiling points, when made of special mixtures for each moulder, and in relatively small batches. When the melting point of a brass is at least 500 degrees lower than its boiling point the metal loss will not be excessive in this type furnace. From the first tabulation it will be seen that this method of melting is most suitable to brasses with less than 20 per cent zinc. This allows for heating sufficiently beyond the melting point to secure a good pouring temperature without approaching too close to the boiling point which causes a very high zinc loss by volatilization.

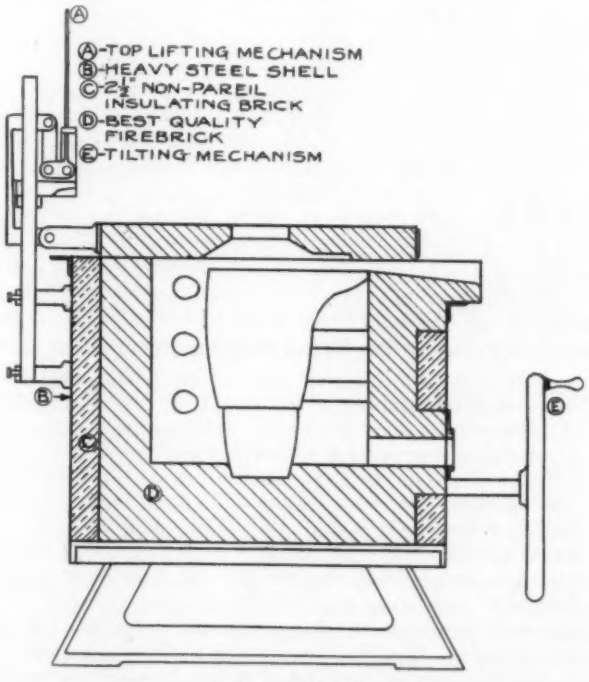
The following is a typical cost for melting brass in a 60 crucible furnace of such a design, when melting 5 heats per day:

Item	Cost per 1000 pounds Gas at $.50 per Million B.t.u	Gas at $1.20 per Million B.t.u.
Gas	$1.25	$3.00
Labor	1.80	1.80
Linings and Refractories	.40	.40
Crucibles	.90	.90
Metal Loss—1½% @ 11c per pound	1.65	1.65
Total	$6.00	$7.75

The average furnace of this type requires about 1¼ hours for the first heat and ¾ hour for other heats.

Tilting Crucible Furnace for Brass

For some operating conditions it is desirable to use a tilting type furnace, and pour directly from the furnace to the mold instead of lifting the crucible from the furnace. This furnace is lined with standard fire-brick backed up by 2½ inches of nonpareil insulating brick, all enclosed in a heavy steel shell. The 60 crucible furnace of this type has a capacity of 180 pounds of brass, and has burner capacity of about 650,000 B.t.u.



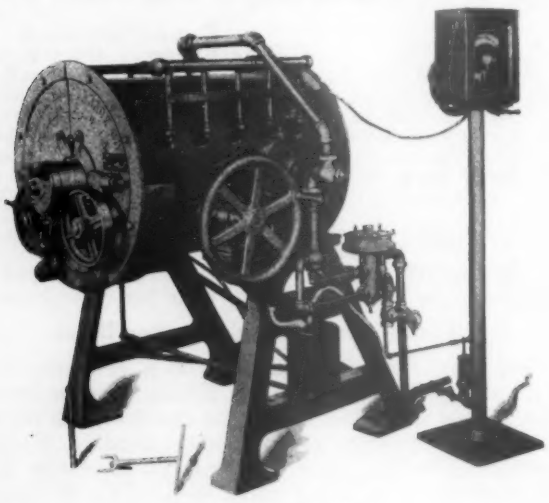
Tilting Type Brass Melting Furnace

per hour. The operating characteristics of this furnace are about those of the stationary furnace previously considered.

Rotary Brass Melter

The most recent development in the brass melting field is the Rotary Brass Melter developed by the American Gas Furnace Company in conjunction with the

American Gas Association. While to date this equipment has not been extensively used under industrial conditions it promises to be of great importance in the future. The brass is melted in a metal retort revolved on its horizontal axis. This retort is contained in a cylindrically shaped chamber heated by a number of gas burners. Due to the retort being closed to the atmosphere, and due to the metal not being exposed to the products of combustion, the metal loss is very low, being less than ½ per cent when working on yellow brass.



Rotary Brass Melter

To date sufficient work has not been done to accumulate accurate information on retort life, but it seems quite probable that metal retorts can be made to give a satisfactory life which will result in retort costs comparable with those in other furnace types. The capacity of the present model is 200 pounds, but this can doubtless be increased. The gas consumption is much lower than on the furnaces previously considered, being about 1000 B.t.u. per pound, on yellow brass. One advantage of this type of furnace is that its adaptability to automatic control. Because of the many inherent advantages in its design, the future will probably show extensive use of brass melting furnaces of this type.

Competitive Brass Melting Equipment

It is impossible to give costs of operating competitive brass melting equipment which will be true in all cases. All that can be done is to give costs for a particular type of equipment operating under certain conditions and to explain the basis of cost computation so that the reader can calculate his costs in any individual case after collecting a few basic facts. For small castings with exact metal specifications, particularly where each moulder has his own metal, small electric arc, or fuel fired crucible furnaces should be used. For large productions of standard mixtures reverberatory and induction furnaces can be used. The most important items of cost are fuel or electric energy, and metal loss. However, crucible, electrode labor, and lining costs are also of some magnitude.

The competitive brass melting equipment most frequently encountered is the small coke fired crucible furnace. These are often used either in a plant with little brass melting or in an old plant which has neglected to modernize its equipment. Contrary to the belief of the operator of such equipment, he has the most expensive method of brass melting. Not only does he use a relatively high priced solid fuel, but he has very high labor costs and metal losses, as well as a dirty shop, and a temperature hard to control. The following gives a typical cost of operation of an installation with from 5 to 10 sixty crucible coke fired furnaces, melting red brass (85-5-5-5).

Item	Cost per 1,000 pounds
Fuel @ $12.00 per ton, delivered	$3.12
Labor	2.96
Linings and refractories	.58
Crucibles (life 23 heats)	1.10
Metal Loss—3% @ 11c per pound	3.30
Total	$11.06

Some melting is done in reverberatory fuel fired furnaces. They are of much larger capacity than crucible furnaces and their operating costs will be approximately those of crucible furnaces fired with the same fuel. Labor and fuel costs are lower and there are no crucibles, but metal losses are much higher. With such furnaces the crucibles, in which the molten metal is transported, must often be heated.

Another competitive furnace is the oil-fired crucible furnace. Its operating characteristics are those of gas and coke fired crucible furnaces, with less dirt and metal loss than the latter and about the same crucible life. A typical cost of operating such a furnace, comparable with the preceding cost for coke fired crucible furnaces, is as follows:

Item	Cost per 1,000 pounds
Fuel—25 gallons @ 6c	$1.50
Labor	2.20
Linings and refractories	.70
Crucibles	1.10
Metal loss—2½% @ 11c per pound	2.75
Total	$8.25

Double Ladle Heater

Electric furnaces are extensively used for brass melting especially where the quantities to be melted are large. If melting is continuous over the twenty-four hours and there is no change in the constitution of the melt it is advantageous to use an induction furnace. This furnace works best on yellow brass. It has a low power consumption, about 200 K.W.H. per ton of brass, and low metal loss, but has a higher lining cost. If there is any change in the constitution of the melt or melting

is not continuous, or if it is a very high copper brass, the rocking type arc furnace is much used. This furnace is made in sizes from 250 to 3000 pound charging capacities. The smaller ones turn out heats in from 15 to 25 minutes, while the larger ones turn out heats in from 45 minutes to one hour. The following is a typical cost for operating the arc types electric furnace:

Item	Cost per 1000 pounds Power Rate 1½c	Power Rate 2½c
Energy	$2.24	$3.83
Labor	1.45	1.45
Refractories	.20	.20
Electrodes — 4.5 pounds per ton	.52	.52
Metal Loss—6% @ 11c per pound	.66	.66
Preheating Crucible	.60	.60
Total	$5.67	$7.26

If the electric rate is higher, the shop small, and the load factor poor, the cost of operation will, of course, be much higher than here illustrated.

The Gas Ladle Heater

In connection with casting of brass and other metals it is often desirable to carry the molten metal in a ladle, or in an insulated crucible. Where ladles are used it is usually necessary to heat them between each pour. If so, they can well be heated by a ladle heater such as that pictured, wherein a gas air mixture is burnt inside the ladle, heating it from bottom to top. The brackets are adjustable so as to accommodate different sized ladles.

(*Series Continued in April Issue*)

As One Manager Sees the Question of Rate Schedules to Meet Competition

To R. S. McBride, Consulting Editor of American Gas Journal.

Sir:—I read with interest your article in the February issue of the *American Gas Journal* on "Ensuring Profits By Sound Rate Schedules."

Approximately one and one-half years ago, or to be exact, August 1, 1929, we established new rate schedules here in Everett, taking into consideration production costs and competitive fuels.

We have two distinct competitive fuels; one is wood. In this section of the United States, due to the proximity of the lumber mills, slab wood is sold and delivered at the low price of $3.25 per cord for green slab, and up to $7.00 per cord for dry slab wood. Coal, in this section, is a low grade bituminous; in fact, it is lignite. Very little is used for cooking purposes; in fact, only a small portion is used for heating.

Our second competitive fuel is electricity, which on the high rate is 5½c per KWH, and down to as low as 2c for cooking purposes.

Another factor in regard to homes here is the fact that over 60% of them have no basements.

Up to August 1, 1929, our domestic gas rate was $2.25 per M for the first thousand, $2.00 per M for the next 2,000, $1.75 per M for the next 3,000, and then $1.50 per M for the next 14,000. We also had a rate where gas was used for cooking, water heating, and heating, which was based upon a demand charge of $4.50 per 100 cu. ft. of demand, plus gas at 60c per M. As you state in your article, this was not popular here, just as in other places where in operation.

In our revised schedule, gas for domestic purposes in general is $2.00 per M for the first M, $1.50 per M for the next 2,000, 85c per M for the next 5,000, and all over 10,000 at 60c per M. When we put this rate into effect, our first month's revenue was decreased from the domestic customers by nearly $900.00; but without any remarkable increase in customers, in January our gross was back to where it was the year previous which indicated that our rate was such that the customers either could afford it financially or mentally.

In order to encourage the use of total fuel, we established a special rate base as follows: $2.00 for the first 1,000, $1.00 each for the next 2,000, and all over 3,000 at 60c per M. This rate carries a minimum of $2.00 per month.

On the general domestic rate, the idea in mind in working it out was that basically it is very desirable to increase the consumption per meter. We used the following estimates in arriving at the various steps:

First, that the average revenue here for cooking is extremely low; namely, 1100 cubic feet per month, which would bring that class of customers in on the first step. Our experience here shows that the average consumption for tank water heaters is from 1500 to 2000 cu. ft. per month which would bring that class of business in on the second step, and if the consumption was over the average it would drop them to the third step, which leaves us in a very advantageous position to talk auxiliary heating to this type of customer.

It is true that some companies have their rates based upon whether the gas is used for cooking, cooking and water heating, and cooking, water heating, and heating. But there are times when such rates cause trouble because a customer may be using a very large amount of gas for cooking and not use other types of equipment, and consequently must pay a high rate for gas.

Inasmuch as we are not concerned about the instantaneous load, I believe that our rates, or rates established on similar principles, will function very nicely. I also wish to commend you for emphasizing the value of establishing dump gas or off peak gas rates because I think that is a factor with manufactured gas in particular which has not been given the proper consideration.

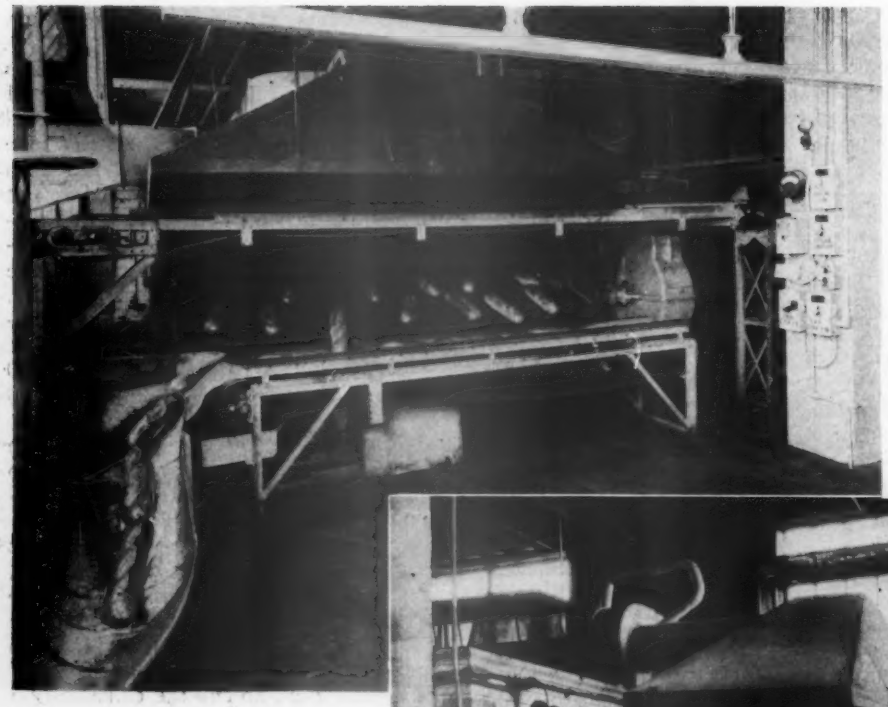
C. E. Lasher.

Manager, Everett Div.
Washington Gas and Electric Co.
Everett, Wash.

Pleasant News

THE Milwaukee Gas Light Co. is going to spend during 1931 $675,000 in construction and other work, according to a statement given out by Ewald Haase, vice president. Most of this money will be used for mains, services and meters. Last year, the sum of $747,000 was spent for this same work. The new gas company office building, costing $1,500,000, was also completed during 1930.

The sum this year may be greater, Mr. Haase said, if the city of Milwaukee does more street work than it now contemplates doing. Construction and other crews of workmen will be maintained in the same numbers this year as they were last, Mr. Haase stated.



Left—Delivery End of 80 ft. Travelling Oven

Below—Feed End of 80 ft. Travelling Oven

Done to a Turn In Modern Gas Ovens

J. B. NEALEY
American Gas Association

ONE of the large Canadian bakeries, located in Toronto, Ontario, is the Brown Bread, Ltd. This firm produces white and whole wheat bread, cake, sweet goods, etc., and the capacity of the plant equipment is sufficient to make and bake 7,500 pounds of bread an hour.

Flour is lifted by elevator to the top floor where it is stored in bags on skids which are moved with lift trucks. The blender with screw drive is located on this floor also, the blended flour being elevated and dropped through sieves and then elevated again and distributed among five storage bins. These bins have a total capacity for 750 bags. The distribution of the flour among these bins is accomplished by a large pipe with a screw conveyor which is fed by the elevator conveyor. There is an opening with a slide in this pipe for each bin and the flow of flour into the individual bins is regulated by these slides, which are operated through a set of hand controls.

Just below these bins and on the third floor are located five water jacketed mixers, each driven by a 50 horse power motor. Hoppers are suspended between the bins and the mixers and these are equipped with automatic weighing scales which correctly proportion the flour for each charge. The operator sets the weight on the hopper scale and opens the balanced door in the bottom of the storage bin. When the scales tip up a device shuts off the flow of flour automatically. The opening of a shutter in the bottom of the hopper then allows the contents to drop into the mixer. Tanks are also supplied to correctly regulate the amount of water for each charge. These are provided with automatic scales and when the correct amount has flowed into the tank they close the valves in the supply lines.

Two of the mixers have a capacity for 5 bbls. of flour, two will handle 4 bbls. each, and the fifth a half a bbl. The ingredient room is directly adjacent and a workman with a truck and a number of batch cans passes along

a line of bins and weighs out the ingredients which are distributed to the mixers and dumped in with the water and flour. There is a large mechanical refrigerating unit in the basement which serves a series of cold storage boxes and is also employed in regulating the temperature of the water in the mixer jackets.

The mixers are cooled, while being revolved, with water at from 32 to 40 deg. F. and the temperatures are regulated by remote controls at the mixers and with the aid of recording pyrometers. The mixing time for the sponge runs between 5 and 7 minutes while that for the dough is from 8 to 11 minutes. Sponge from the first mixing is dumped into long troughs suspended from an overhead conveyor system, weighed and shoved into the fermentation room.

This conveyor system consists of a single track loop running past all of the mixers and into the fermentation room where the troughs are shunted off onto short branch lines completely filling the room. This room which is 30 x 75 ft. will accommodate close to 40 troughs and is kept at 68 deg. of humidity and 78 deg. temperature. This atmosphere is supplied by an automatic humidifier. There are three of these units, one for the fermentation room and two for the two proofers.

When properly fermented the sponge is rolled back to the mixers where a section of the track is elevated so as to bring the trough to a position above the mixers and the contents are dumped through holes in the bottoms. The mixers are provided with electric controls so that they can be started and stopped in any position.

Dough from the second mixing is dumped into troughs which are routed on a short line to two chutes which serve two motorized dividers on the second floor. One of these is of the 4-pocket type and the other of the 6-pocket kind. Hopper fed, they automatically cut out the correct weight of dough for each loaf and drop it onto a belt conveyor to the rounders and the rounders discharge it onto proofing conveyor. This latter consists of an endless double chain with cast iron trays suspended between. These trays have six pockets each and the conveyor rises five feet and then straightens out in the proofing box some 50 ft. in length On the return travel through this box the trays automatically dump the dough balls onto a short belt conveyor which feed them to the moulders, four in number, which shape them and one automatically places them in pans, while this operation is performed by hand for the others.

These pans are fed to the operators on a short roller conveyor and as fast as filled they are put onto racks. These racks are suspended from an overhead trolley system with tracks running through proof boxes which are kept at 92 deg. temperature and 75 deg. of humidity. The dough is allowed to remain in them for periods ranging from 20 minutes to 65 minutes. The racks are then pulled out and placed adjacent to the loading end of the baking oven.

This oven is constructed of brick, steel encased, and is 80 ft. long and 9 ft. wide. It is equipped with a traveling hearth of steel plates carried between two endless chains and driven by a motor through speed reduction train. In this way the baking period can be adjusted to any length of time, but usually falls between 15 and 45 minutes. Heat is supplied by gas fuel firing through 96 long pipe burners extending clear across the oven in two rows, one under and one above the hearth.

Baking temperatures range between 400 and 450 deg. F. and temperature control is aided by the use of a multi stationed visual pyrometer connected to 8 thermocouples evenly distributed throughout the oven. Steam is blown in at the front end.

A short loading platform on the front end receives the bread and a mechanical pusher pushes it onto the traveling conveyor. At the other end an operator dumps the bread down a chute to the floor below and places the pans onto a belt conveyor which takes them back to the moulders. On the first floor are three automatic wrapping machines and an automatic slicer. The slicer consists of a belt conveyor which takes the loaf under a holder with 22 knives which cuts it into 24 slices. The sliced loaf is then lifted into a pasteboard container, racked and taken to the wrapping machine.

Equipment for cake and sweet goods is located in nearby space and here are four motorized mixers which are not water jacketted. Batches are made up and dumped directly into them and when mixed are poured into containers swung from an overhead monorail conveyor. These are placed over tables, and pans and groups of cups are run under and filled and then placed on a belt conveyor which takes them to the bake oven. Some are placed on racks and moved to another department where fancy icing, etc., is put on in the conventional manner. The bake oven is gas fired and the duplicate of the one already described.

Doughnuts are made in a separate department where are located 8 frying kettles, 4 being round pots and 4 rectangular in shape. Each is fired with a single gas burner.

The wrapped bread is sent to the checking room on racks and then placed in drawers with handles in other racks. These are rolled to the loading platform and the drawers are placed in compartments on both sides of the wagons.

Embrittlement in Boilers

A RECENT bulletin, "Embrittlement in Boilers," published by University of Illinois Engineering Experiment Station, reports the following summarized conclusions as a result of this study and investigation:

(1) Embrittlement in boiler plate is caused by the combined action of stress and chemical attack. The stresses are inherent in the construction and operation of the boiler, while the chemical attack is caused by the presence of sodium hydroxide in the boiler water.

(2) Certain methods of water treatment tend to convert some safe waters into the characteristic type which produces embrittlement.

(3) The presence of sodium sulphate in the boiler water tends to retard the embrittling effect of the sodium hydroxide and, if in proper proportions, will stop it entirely.

(4) The presence of phosphates, tannates, chromates, nitrates, acetates, etc., will also inhibit the embrittling action of caustic soda if these salts are present in the boiler water in proper amounts.

(5) Methods for the introduction of some of the newer inhibiting agents to feed water have been worked out, and are in operation in large power plants.

(6) No steel suitable for boiler plate has been found which is resistant to the embrittling action of caustic soda.

A Trying Problem

Prominent Gas Men Comment on Effects of Change-Over to Natural Gas on the Manufacturing Plant and its Personnel

TWO phases of the change-over from manufactured gas to natural gas have received but scant discussion. These are first, the sort of stand-by emergency manufacturing organization that should be maintained, and second, the arrangements made for retaining in the company staff the worth while men of manufacturing departments who are not needed in manufacturing-division operation when natural gas arrives. Obviously, these items call for careful consideration and accordingly, the views of several prominent gas men presented below constitute an important contribution to management procedure.

How Denver Handled the Matter

GEORGE WEHRLE

Supt. Gas Department, Public Service Company of Colorado

PERSONNEL problems encountered when changing from manufactured to natural gas are very important matters that have not been covered in previous writing and subjects that are very pertinent at this time.

The men that we most desire to keep and find other employment for in the company are the key men and operators that we would need for emergency operation of standby equipment. I think the likelihood in these days of ever needing to start up the plant on account of an emergency caused by failure of natural gas supply is quite remote, however, it makes some of us feel better to believe we have made preparation to handle emergencies if they should occur. We have available about our company key men of the old gas plant organization, including superintendents, operators and engineers. We have not used any of them at the plant during the two and one-half years of natural gas operations and have not the least idea we ever will, but we have them now if we should need them. Five or ten years from now may be a different story.

Our problem in Denver was that of disposing of about 250 men employed at the gas works when the plant was shut down upon the introduction of natural gas. These men had been with us for varying periods from forty years downward. We listed the men with their records of length of service and ability and naturally weeded out about 80%. The 20% left were again sorted and a number of them found to be of an age justifying retirement from active service and their length of service justifying annuities. The others were placed in various positions about the company, in some cases requiring retirement or demotion when incumbents were relatively new men.

All men let go were given cards stating their employment records and recommending them for employment to any one concerned. All department heads and foremen in our various companies were instructed to give the bearers of the cards preference over all others. For some time after the plant shut down, no new men were hired anywhere in the company until it was ascertained that no ex-employe was available for the job.

Fortunately, for some time after natural gas is introduced, there is an abundance of street construction and appliance installation work requiring additions to the payroll which can be filled to a large extent from the ex-plant employes.

Plant Kept in Running Order

A. E. MERCHANT

Gen. Supt. Gas Department, New Orleans Public Service, Inc.

THE introduction of natural gas in cities formerly supplied with artificial gas always furnishes a problem of what to do with the many employees who have served the company long and faithfully, and who are no longer required in the manufacturing end. Every company has employees who have been in the service from early boyhood. In fact, they have become so old that they never could hold any position where manual strength is necessary.

In the manufacturing end there are always positions which require men of experience, yet they do not require manual strength to fill them. With the closing down of the plant it is quite a problem to place these men. However, a large number of companies, such as ours, have established a pension system whereby old employees who are incapacitated for any other work than watchmen have been placed on the pension roll. All other employees than those who are required to maintain the plant as a stand-by proposition have been placed in the Distribution Department in accordance with their seniority.

Our stand-by personnel consists of the Superintendent, formerly in charge of the plant, and a skeleton crew to maintain all of the equipment and holders. The reason for placing many of the men familiar with the operation of the plant in the Distribution Department is extremely

advantageous, since, should it become necessary to start the plant due to pipe line interruptions or repairs, men who are familiar with the details in the manufacturing end would be available.

This plan has proved extremely beneficial, as we were called upon to start our manufacturing plant twice since the introduction of natural gas in 1928, in order that our customers would not be deprived of gas while repairs were being made. In our case the interruptions were of short duration and we were able, notwithstanding all the equipment had been out of service for several months, to start a fire and have gas made within a comparatively short time.

The crew comprising the maintenance of the plant consists of the following:

One Superintendent
One Foreman
One Stationary Engineer
Three Gas Distributors
About four maintenance men

So as to be ready when an emergency occurs all of the equipment has to be operated at intervals. It is very desirable in maintaining a stand-by emergency manufacturing organization that equipment should be inspected continuously; also, that motors and steam turbines used in connection with the production end be turned over occasionally, as equipment idle deteriorates very rapidly. Most of our equipment is motor driven, and all motors are turned over twice a month. Fire is also started in the boilers three or four times during the year so that all steam equipment is placed in operation.

The watch-foremen who formerly were in charge of the plant operation are now used as gas distributors, that is, they look after the regulation of pressures, see that the holders are kept full together with looking after the rehydration and odorization end. Practically all of the young engineers that were used at the plant have been assigned to other duties, such as taking care of pressure, surveying saturation, odorization, and acting as dispatchers at the city gate.

Recommends Retaining Minimum Equipment

EDGAR G. HILL
Vice-President, Southern Natural Gas Corporation

MY ideas as to the necessity for maintaining standby service in manufactured gas plants that have been changed over to natural gas, are quite definite, in that I feel that the only equipment retained should be the holders and the pumps, or blowers that are used to take the gas from the holders and put it into the distributing mains. The holders should be, of course, kept full of natural gas and the pumps or blowers should be ready for instant service. After the property has been changed over to natural gas, the property must rely on natural gas for its service thereafter, as every appliance in the town has been adjusted to natural gas, and in the event of a failure of the natural gas supply, these appliances would not burn manufactured gas satisfactorily, and could, under no circumstances be readjusted to use manufactured gas in time to be of any service before the interruption of natural gas could be remedied.

It is, therefore, squarely up to the transporting company to maintain uninterrupted service to the distributing company, which is relying upon it, and correspondingly, it is an absolute waste of time and money to attempt to maintain the gas manufacturing plant, with the exceptions which I have mentioned above, in service, ready for emergency use.

Problem Tended to Solve Itself

W. A. DUNKLEY
Superintendent, Memphis Power & Light Company

THIS matter is a real problem to companies making this change for in every organization which maintains a manufacturing plant there are a certain number of men highly trained in their particular work, many of whom have served the company satisfactorily during their best years and to discharge such men especially during times when employment is scarce would not only work a hardship upon them but would be a reflection upon the company.

I gave a greal deal of thought to this problem before natural gas arrived in Memphis, but I found that the problem solved itself much better than I had anticipated. The arrival of natural gas means as a usual thing, a great expansion in certain parts of our work notably in the distribution system and in the installation of customers' appliances both domestic and industrial. My first thought was in the placing of my key men where they could be retained as emergency operators and at the same time earn their usual salaries in new work. In our old work we had a manufacturing department and a distribution department, the latter handled the extension of mains and services, the maintenance of these same facilities together with the maintenance of meters, the installation of customers appliances and the handling of complaints. With the shut-down of our manufacturing plant I divided the distribution into two divisions, namely, the Distribution division which now handles mains, services and meters and the Utilization division, which handles all installation work with the exception of services on customers' premises.

Our plant superintendent was a high grade man about thirty-five years of age and fortunately a man who could adapt himself readily to changing conditions. He became our superintendent of the Utilization division. In order to prepare him more adequately for the work I gave him the problem with the assistance of an able appliance man, of training our force for converting customers appliances and handling the conversion work when natural gas arrived; all of which he handled very creditably and was able upon the arrival of natural gas and the completion of the conversion work to take charge of the Utilization division. During the past two years this man has become an expert on househeating problems and the installation of conversion burners in household furnaces.

The man who was assistant superintendent of the plant was given charge of all pressure regulation throughout our system. He has become entirely familiar with orifice meters such as are used for city gate metering installations and one of his duties is to check monthly the meters by which our gas is purchased. He also has charge of the stand-by operating plant keeping everything in condition ready to operate if necessary and he is entirely familiar with the mechanism and operation of district regulators.

We also had three foremen in the plant, each of whom handled an eight hour working shift. These three men were middle aged men of long service but of different temperaments. The oldest of the men I left in the gas plant to maintain the equipment which he does with the assistance of one or two men. A second foreman now has charge of the industrial burner installations. His crew puts burners into boiler plants and other manufacturing operations under the supervision of an industrial gas engineer whom we obtained from outside. The third foreman became an inspector on heating installations in domestic furnaces.

The rank and file of our plant operating force was distributed between the Distribution and Utilization departments. Most of our plant laborers were negroes and they were put onto street gangs doing construction and maintenance work. The white men for the most part went to the Utilization department where they became pipe fitters installing appliances. Three of the oldest white employes who are hardly able to do fitting work were put in charge of our main regulator station where their duties require watchfulness and conscientious attention but do not require heavy physical labor.

I believe that the above outlines quite completely just how we handled our plant force. We keep their names, addresses, and telephone numbers where they can be referred to quickly if off duty so that we will be able to call together an operating force immediately should an emergency arise. I cannot recall a single instance where anyone who had been in our employ for a reasonable length of time and had given good service was discharged when natural gas arrived. Our Utilization and Distribution divisions have had so much work incidental to securing a maximum amount of natural gas load in a minimum time that our forces have been kept efficiently busy a larger part of the time.

Of course when our natural gas market becomes more nearly saturated than at the present it may be necessary to carry on a weeding-out process by which we will retain those employees best adapted to our needs and encourage the others to secure employment elsewhere at the earliest possible opportunity. It is our plan to make this process just as painless as possible to those concerned. One method is to shift men from one job to another when vacancies occur and avoid hiring new men into the organization. Our labor turnover in the gas department has never been very heavy but of course there are a few vacancies every year due to deaths or resignations.

Value of Water Gas and Coal Gas Plants in Emergency

ALFRED HURLBURT

Central Public Service Corporation, Chicago

IN Coal Gas plants there is just nothing to do but shut down and forget any plant; in a Water Gas plant, for the first you can keep some forces about, but after that the load gets so large, or should, if the company is to live, that the Water Gas plant does not amount to much. The change-over means using such manufacturing plant men where you can in other departments, but it means that a large part of the forces must find other employment.

Mr. J. W. Gates, manager of the Atlanta Gas Light Company, comments as follows: "We are holding our plant, as far as water gas machines are concerned, as a standby emergency manufacturing plant. Fortunately, here in Atlanta with our three million holder capacity and our water gas sets, we will be able to take care of our domestic consumers during the first year, even with an interruption of a week or ten days.

"We are not keeping up steam at the plant, but we have our boilers rigged up so we could fire them with oil and on two occasions since natural gas was turned on, we have had the water gas sets ready to operate in approximately one hour's notice. We are, also, not holding any organization other than our Superintendent, and water gas makers, all of whom are being valuably used on other work.

"If natural gas is introduced into any town where the manufacturing plant consists of coal gas sets only, it would be practically impossible, in my opinion, to attempt to maintain any standby emergency manufacturing plant. However, there is some question in my mind but that it would pay to make a temporary installation of water gas machines to take care of any emergency for the first year because, in my opinion, an interruption in service for the first year is quite expensive to the company, mostly because, again in my opinion, it would seriously handicap the taking on of new and additional business, and certainly new and additional business is the only hope for a manufacturing plant changing over to natural gas."

Public Relations Aspect of Personnel Management

THE large corporations of the country have become so convinced during the past decade of the business soundness of proper employees relations and practically all of them are doing so good a job in this line that unless a company has worked out something exceptional it cannot hope to attract attention by anything it does in the line of industrial relations.

There is one way, however, in which an industrial relations program can be made to help the selling department, if the program is carried on in such a manner that it arouses a spirit of loyalty and enthusiasm for the company among the employees. If a large force of loyal employees is forever telling all of their friends what a fine company they work for, what fine goods they make and the high standards of workmanship they demand, they are bound to help sales. My advice to any company in which this spirit prevails is to keep its employees fully informed about what the company is doing and making. The employees want to help; any information which is given to them relating to the company and its activities helps them to be more articulate in their enthusiasm.

In this matter of an employee's feeling toward his company, there is nothing that wins his respect more surely than strict demands for efficiency. The employee has little esteem for any measure presumably for his benefit or which has for its basis nothing but a paternalistic spirit. —*C. S. Ching before Public Relations Conference, American Management Assn.*

The Complete Gasification of Coal

Dr. R. MEZGER and Dr. T. PAYER

Das Gas and Wasserfach, 1930, pages 1-8

(Continued from February issue)

A COAL that is suitable for coal gas manufacture must meet the following requirements. It must not swell up. Its gaseous and tarry constituents must be released at a temperature between 575 and 1120 degrees F, which means within as low as possible a temperature range. It must contain as much gaseous and tarry constituents as possible with respect to the fixed carbon content. It must yield a gas which possesses a high thermal value. Finally, it must yield a tar which is easily cracked to produce an oil or tar gas.

In order to test the value of a coal to determine how well it meets these requirements, the commonly used testing methods cannot be used. The authors have been concerned with the problem of establishing suitable methods for this purpose and they have developed new methods.

Analysis Procedure

An analysis must be made of the coal. This affords information on the suitability of a definite type of coal for the purpose at hand. The proportions of ash and moisture in the coal are also necessary for the determination of the expected thermal value of the gas obtained by complete gasification as well as of the yield of gas.

The apparatus which was used for this purpose is shown in figure 3. An iron crucible (B) is closed with a cover which is screwed on and which is provided with a T-shaped connection. The pyrometer (D) as well as the inlet tube (E) through which nitrogen gas is admitted are inserted through the connection. The tube (E) is held fast with a rubber ring (Q). In order to prevent the burning of the rubber ring (Q) during the heating process, it is surrounded by a water bath (F). The horizontal portion of the aforementioned T-shaped connection is connected with a glass tube with the aid of a rubber tube (R). The burette (J), a second burette (H) and the manometer (K) are connected to the glass tube as shown. The iron crucible (B) is brought up to the desired temperature by means of the electric furnace (A). The resistance (N) as well as the mercury regulator (O) are used for regulating and maintaining a definite temperature. The temperature between the electric furnace and the iron crucible is determined by means of the pyrometer (G). The burettes (H) and (J) are filled with acidified and gas-saturated water at the beginning of the experiment, and so is the U-portion of the manometer (K). The cylinder (L) is used to catch the flow of water from the burettes (H) and (J).

An asbestos board (S) is placed between the electric furnace and the burettes in order to insulate the latter. The temperature is recorded by means of a duplex recording thermometer (M). The temperature and the quantity of gas evolved are read every five minutes and

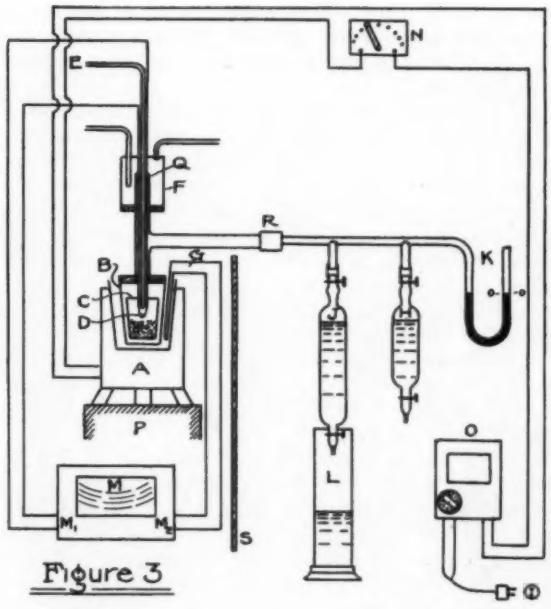


Figure 3

recorded. Inasmuch as the difference between the external and internal temperatures, that is between the pyrometer (G) and the pyrometer (D), is quite constant, it is possible to control the temperature according to variations in the external temperature.

Purging with Nitrogen

The apparatus is used in the following manner. The electric furnace (A) is heated up to a temperature of about 760 degrees F. before the actual test is started. Exactly two grams of the coal, which is being tested, are weighed out into an ordinary porcelain crucible (C) and this is placed in the outer crucible (B). A piece of asbestos paper, impregnated with water gas solution, is used to make sure that the joint between the cover and the crucible is absolutely tight. The apparatus is now connected up. Before the crucible is placed within the electric furnace, nitrogen gas must be passed through the tube (E) into the apparatus to wash it free of air. The gas must also pass through the half-filled manometer (K). This avoids oxidation of the coke produced by the oxygen in the air at the high temperatures that prevail in the apparatus. Four to five liters (about 240 to 300 cubic inches) are sufficient.

The entrance of gas through (E) is prevented by the use of a pinchcock. After it is certain that the apparatus is absolutely gas-tight, the electric furnace (A) is pushed up under the crucible and maintained in place by the support (P). The heat causes the expansion of the nitrogen contained in the interior of the crucible and this nitrogen causes the liquid to rise in the manometer (K). Equalization of pressure can be secured by allowing some water to run out of the burette (H). A fundamental condition during the test is that sufficient water is allowed to run off, so that the manometer is always at the zero point.

The burette (H) is manipulated to obtain pressure equalization during the test until the temperature inside the crucible rises to approximately 480 degrees F. as indicated by the pyrometer (D). No gas is evolved during this period, but the expansion of the nitrogen is so great that approximately 35 to 38 cubic centimeters of liquid are run off. This is determined by means of a blank test which is made without coke being filled into the apparatus. Then the burette (H) is closed off and

burette (J) is used. The collection of nitrogen gas in burette (J) has for its purpose the prevention of too great dilution of gas with nitrogen, later to be absorbed in the burette (J).

The temperature is now raised to 570 degrees F. This is done slowly. First signs of the evolution of gas are noticed at this point in most coals, and the evolution of gas increases slowly as the temperature rises. The heating is conducted in such a manner that the temperature is maintained in each instance for approximately fifteen minutes at 570, 750, 930 and 1110 degrees F, until all signs of evolution of gas are absent at each stage of the heating. The temperature is read every five minutes. The quantity of liquid run off into the cylinder (L) is determined at the same time, and therewith the quantity of gas evolved. The temperature is quickly raised from stage to stage, as indicated above, after each fifteen minute period.

After a temperature of 1110 degrees F has been reached, the burette (J) is shut off and the burette (H) is provided with a levelling flask. The electric furnace is removed, the hot crucible (B) cooled off to room temperature. Then as much liquid is allowed to flow into the burette (H) from the levelling flask, so that the manometer reads zero. After being completely cooled off, the burette (H) is closed, the crucible removed from its container, the coke in the porcelain crucible weighed and saved for additional investigation. The manner of heating the crucible indicates that in imitation of practical conditions a portion of the tar obtained is decomposed into gas and high temperature tar. The remaining tar is condensed and collected in the tube that connects the T-piece with the collecting apparatus.

The quantity of gas obtained is reduced to normal temperature and calculated on unit weight of coal, say 220 pounds (In the original article the calculations were based on one hundred kilograms of coal). The heating value of the gas is determined with the aid of a suitable calorimeter. The gas residue is analyzed for its nitrogen content and the thermal value, obtained with the aid of the calorimeter, is recalculated on the basis of a nitrogen-free coal gas, whereby a two per cent nitrogen content is assumed. This conforms to practice.

Testing the Coke

The coke obtained is tested to obtain further information on the behavior of coal at high temperature. A coke, which tends to swell and cake, will produce a swollen cake of coke, which is pressed against the walls of the crucible. The volume of coke that is obtained from the same weight of coal used in the test each time, namely two grams, may be expressed as the coefficient of swelling. This volume is obtained with the aid of a pycnometer, in which fine, ignited sea sand is used as the filling in the place of water. The displacement in volume determined from the sand weight can be recalculated to the water basis by means of the known relation, pycnometer filled with water to pycnometer filled with sand. The volume of the coke that is determined in this fashion gives the coefficient of swelling of the coal.

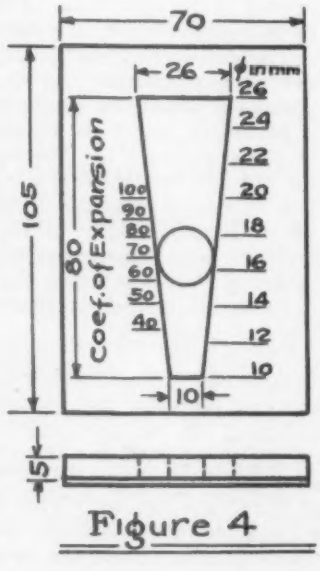


Figure 4

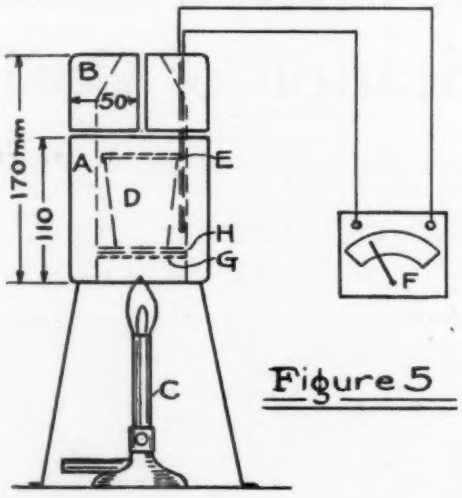


Figure 5

The following example will serve to show how these calculations are made. The weight of the sand in the pycnometer was found to be 24.5100 grams, the weight of the water filled into the pycnometer was found to be 16.4100 grams. The factor that must be used in the recalculation on the water basis is therefore, 16.4100 divided by 24.5100 or 0.6695. The weight of the pycnometer filled with coke and sand was found to be 32.4390 and the weight of the pycnometer filled with coke was determined to be 12.6298, the difference in weight being 19.8092 grams. The pycnometer, filled with sand, weighed 24.5100 grams and from this is subtracted the difference in weight, 19.8092, giving 4.7008 grams of sand which has been displaced by the coke. The coefficient of swelling is therefore 4.7008 x 0.6695 or 3.16.

Value of Crucible Test

The crucible test also affords information on whether or not a certain coal has the tendency of expanding in the transverse direction. If the cake of coke which is obtained at the lower and higher coking temperatures, is separated from the walls of the crucible by a greater or lesser space or lies right against the walls, then the coal will behave in similar manner in the retort. Thus in one instance, the coke will readily slip out of the retort when removed by the pusher, and in another case it may have a tendency to stick to the walls of the retort. The coefficient of expansion may be used as a numerical determination of the tendency of the coke to adhere to the retort walls.

All the coking experiments were carried out in the same porcelain crucible. This crucible has an internal diameter of 20.2 millimeters at a height of five millimeters. This diameter corresponds to a surface area of 320 square millimeters. If a cake of coke possesses exactly this diameter at a height of five millimeters from the bottom and hence this surface area as well at the same height, then the coefficient of expansion may be assumed to be 100 or 100 per cent. On the other hand, if its diameter is only seventeen millimeters at this point, then the corresponding surface area is 227 square millimeters or 71 per cent of the maximum surface area. The coefficient of expansion in this case is 71. The diameter of the cake of coke is determined with the aid of the cone section shown in figure 4, which sinks into the cake of coke for exactly five millimeters. This cake

of coke corresponds to a coefficient of expansion of 71.

Testing for Caking Capacity

The coal was tested for its capacity of caking by the Kattwinkel method (see Teer und Bitumen, 1928, page 245 and Das Gas und Wasserfach, 1926, page 145.) In this method a new sample of coke must be weighed into a platinum crucible. The cake of coke is prepared by coking together with quartz sand in a furnace which is especially designed for this purpose and built of kieselguhr insulated brick. The coefficient of caking of the coal is established from this cake of coke. The coking furnace is shown in figure 5. It consists of the lower portion (A) and the upper portion, the cover (B). The latter is also made of two pieces. The lower half serves for holding the platinum crucible and is consequently hollowed out. A wire gauze (G) and a thin asbestos plate (H) hold the platinum crucible. The pyrometer (E), which is provided with an indicating instrument (F) is used for measuring the temperature. The furnace is heated by means of the Bunsen burner (C). The same final temperatures, which were used in the principal test explained above, also serve here as coking temperatures. These are namely 890 and 1110 degrees F. The flame of the burner is regulated in such a manner that the duration of heating always lasts ten minutes.

In discussing the properties which a coal should possess for use in the complete gasification process, the author mentions the easy evolution of gas or of the volatile constituents at as low as possible a temperature. Of similar importance is the quantity of volatile ingredients, tar and gas, which is evolved at one time at low temperature, 890 degrees F. and at another time at higher temperature, 1110 degrees F. It may be generally concluded that a coal is more valuable, all other conditions remaining constant, when the difference between the volatile constituents is as small as possible between the two temperatures, which means that if the content of volatile matter at a temperature of 1100 degrees F is designated as 100 (100 per cent), then the quantity of volatile matter evolved at the lower temperature should approach this figure as closely as possible. This coefficient is called the coefficient of volatility.

Gas Yield

Various coals were accordingly investigated to determine the quantity of gas that they yield in the complete gasification process and the thermal value of this gas. It was found as standard that 220 pounds of pure coke will give 6700 cubic feet of blue gas with a thermal value of 300 B.T.U. per cubic foot. The heating value and the yield of blue gas were determined in each case by calculation from the weight of coke obtained. Furthermore, the quantity of coal gas, which was obtained up to a temperature of 1110 degrees F, is multiplied by its thermal value and then the total heating value is obtained. The sum of the blue gas obtained and also of the coal gas gives the yield of complete gasification gas. It was assumed therein that only more water gas is formed without any noteworthy production of heavier coal gas from anthracite coal in processes which are carried out at temperatures in excess of 1110 degrees F. If this figure is divided into the sum of the thermal value or content of the blue gas and the coal gas, then the heating value per cubic foot of mixed complete gasification gas is obtained.

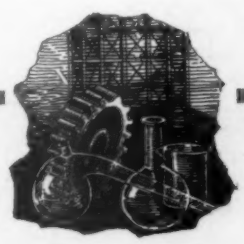
(The original article contains considerable data on the tests made. As this is of no vital interest, it is omitted here and the interested reader is referred to the original article for further information.—Editor.)

Various interesting conclusions were obtained from the numerical data collected. The coefficient of volatility should be as high as possible and the coefficient of caking should be as low as possible. It should be as close as possible to zero in the carbonization tests made at a temperature of 1110 degrees F. The coefficient of swelling should not be greater than two to two and one half. The coefficient of expansion should be as small as possible. If it is greater than 85, then difficulties will arise in the operation of the retorts with this kind of coal due to the fact that the coke will remain adhering to the walls of the retorts. These characteristics allow the definition of a coal best suited for the complete gasification process. All the various coefficients must be considered not as representing separate properties of the coal but as parts of a composite characterization and the value of the coal should be determined along these lines. The most important characteristics of a coal that is to be used in the complete gasification process are the coefficient of expansion, the coefficient of swelling and the capacity of caking.

Summary

The purpose of this article has been to describe the important technical details that must be given considerate attention in the complete gasification process. The manner in which complete gasification gas can be used for mixing with coal gas to make a mixed gas has also been described. The advantages of the use of generators for the generation of gas in the gas works were enumerated and particular attention was given to the usefulness of the complete gasification in meeting peak load conditions.

The difficulties that arise in the complete gasification process were also detailed. It is only when these difficulties are clearly defined and appreciated that measures for their removal can be correctly undertaken. The essential properties of a coal, that is to be used in the complete gasification process, were also depicted. Certain methods and apparatus for determining these properties were discussed and the results were analyzed. It is important to bear in mind that in examining a coal to determine whether or not it should and can be used for complete gasification, consideration must be taken of the various coefficients as a whole. The coals should be compared with each other on this basis and when this is done, the best coal will be selected.



Coke Oven Operation and Maintenance

F. J. PFLUKE

Rochester Gas & Electric Corporation

IN the three previous articles of this series we discussed the important factors contributing to long and efficient oven operation. It was pointed out that to this end proper maintenance of the oven brickwork, auxiliary apparatus and instruments as well as careful supervision of the heating operation is absolutely essential. In addition the routine operation of the ovens must receive careful supervision of a competent foreman at all times.

Operating Schedule

Of prime importance for efficient operation is strict adherence to a definite operating schedule. The pushing and charging schedule should be posted and faithfully followed. Delays should be avoided as much as possible. When long delays are encountered the gas and air should be controlled to prevent overcoking. Overcoking or undercoking are very detrimental to the ovens as excessive strains may be set up in the walls when pushing out such charges.

Pushing

The pusher ram motor circuit should always be provided with an overload relay which is set to "kick out" at a current intensity of about 50 amperes more than the maximum required for pushing in the regular operation. Under no circumstances should this relay be "plugged" or held in to get extra power for pushing out a "sticker." Under no circumstances should the pusher operator be allowed to "bump" a charge in order to start it. Serious damage to the oven walls has resulted where this practice has been permitted. The pusher ram should always be stopped before touching the charge and should then be gently brought in contact with the coke. The pusher ram speed should then be increased gradually as the charge begins to move. If a charge cannot be pushed with normal power the cause should first be determined.

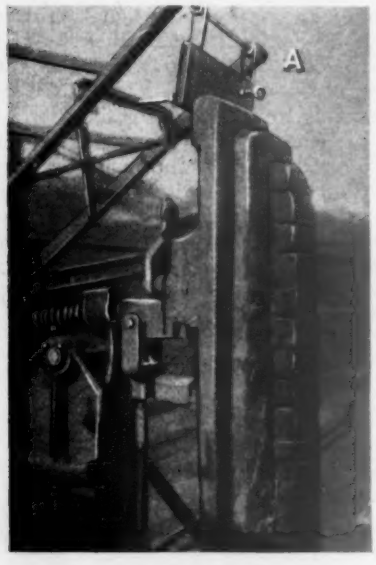


Fig. I—Scraper at A

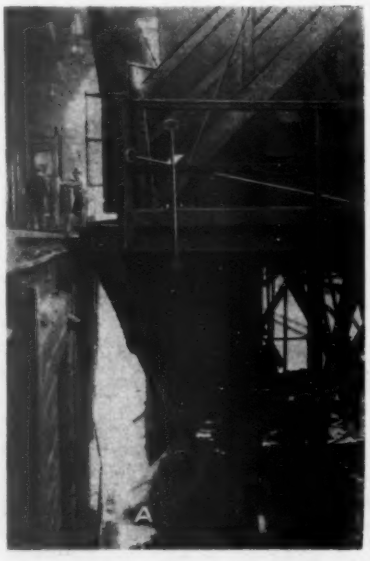


Fig. II—Old Clay Hopper at A

The cause will usually be found to be one of the following:

1. Overcoking
2. Undercoking
3. Excessive wall carbon
4. Dirt on oven floor
5. Expanding coal.

If overcoking is the cause, a small part of the charge should be raked out of the oven with a hoe and the pusher again tried. This operation should be repeated until the charge moves. Many times the coke in contact with the ram crushes and causes the ram to wedge. As soon as the broken coke is faced off, the charge often moves.

Where hard pushing is caused by undercoking, the doors should be replaced and reluted and pushing attempted later. The cause of the cold charge should be determined and corrected and the oven filled with a small charge of coal to insure a well coked charge, at the next pushing time.

If excessive wall carbon is the cause of the hard pushing it will usually be necessary to rake the coke out as in the case of an overcoked charge. Similarly if dirt on the floor is the cause the rake must be used to remove enough coke so that the obstruction may be cleaned off. Likewise where expanding coal is the cause, the charge should be raked out of the oven.

Preparation of Oven for Charging

Before replacing the doors after pushing they should be thoroughly cleaned. All old luting material should be removed and the pitch scraped from the door and oven jams to insure that the doors shall seat properly. The tops of the doors are usually difficult to clean and to simplify this operation a simple scraping device may be fitted to the pusher and door machine to remove the old luting material. Such a scraper is shown in Figure I. The old luting material should be saved for mixing

with the new clay. A very simple means of handling the old lute is to provide a hopper on the pusher into which the material may be shoveled. Figure II shows a pusher provided with a clay hopper. Pulled back coke should be quenched immediately and put into another hopper or wheeled to the coke car. Hot coke should never be allowed to remain in contact with the buckstays otherwise warping is apt to result. Under no circumstances should the operators be allowed to shovel pulled back coke into the empty oven. If this practice is allowed trouble is sure to be encountered eventually as it is impossible to separate all the dirt from the coke.

After thoroughly cleaning the doors they should be carefully centered and replaced, taking care not to bump them into the jams. Constant shock of the jams will cause leaks in the brickwork.

The door luting should be left off as long as possible in order to permit air to be drawn into the oven and burn off wall carbon. Enough time should be allowed before charging for the luter to do a neat job and for the lute to dry thoroughly. It is very essential that the doors be tightly luted, as gas leaking from poorly luted doors is apt to be ignited and cause heating and warping of the buckstays as well as the doors themselves.

The gas offtake pipes should be thoroughly cleaned each time before charging. Clogged offtake pipes will cause excessive pressure on the ovens and will loosen the door luting. Care should be taken when cleaning offtake pipes not to knock carbon into the valves sealing the ovens off from the collector main. If carbon and pitch collects in the valve the spray liquor may be sealed off so it cannot run into the collector main as it should. Consequently, it will run into the oven, causing serious damage to the walls.

Before charging an oven, the liquor spray should be carefully inspected to be sure it is working properly and that no liquor is splashing into the oven. Many ovens have suffered serious damage to the walls because of broken or defective sprays.

Decarbonizing

Most oven operators experience carbon trouble of one form or other. High volatile crushed coal usually produces wall carbon while pulverized coal causes roof carbon. Every effort should be exerted to prevent carbon becoming thick and hard. Wall carbon formation may usually be prevented by leaving an oven open about thirty minutes before charging and allowing air to be pulled thru the doors and discharged out the offtake pipe. Leaving the charging hole covers off helps burn carbon formation. If the offtake pipes are provided with steam nozzles for charging they may be used to advantage to increase the air circulation.

Roof carbon is often kept under control by providing the ram head with a light scraper which removes the carbon formation before it has the opportunity to adhere tightly to the brick. Some plants have found it necessary to blow the carbon off during the pushing operation by installing air nozzles on the ram head and compressor on the pusher to furnish the necessary air. It is recommended that when serious carbon trouble is encountered the oven builder be consulted before resorting to any scrapers as mentioned above, as serious damage may result if scrapers are not constructed and used properly.

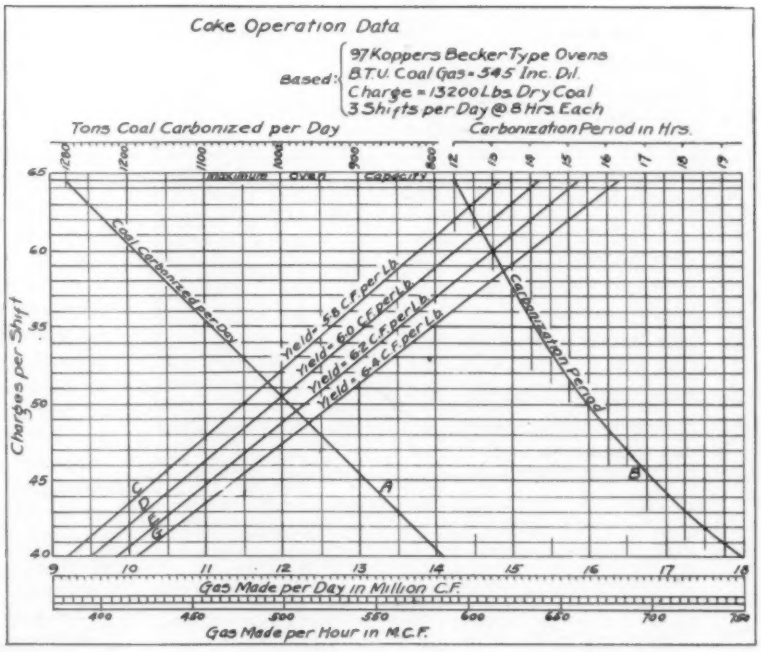

Coke Operation Data
Based: 97 Koppers Becker Type Ovens
B.T.U. Coal Gas = 545 Inc. Dil.
Charge = 13200 Lbs. Dry Coal
3 Shifts per Day @ 8 Hrs. Each
Tons Coal Carbonized per Day
Carbonization Period in Hrs.
Maximum Oven Capacity
Coal Carbonized per Day
Yield = 5.8 C.F. per Lb.
Yield = 6.0 C.F. per Lb.
Yield = 6.2 C.F. per Lb.
Yield = 6.4 C.F. per Lb.
Carbonization Period
Charges per Shift
Gas Made per Day in Million C.F.
Gas Made per Hour in M.C.F.

Chart B

Filling the Oven

The amount of coal should be determined which will fill the oven up to the leveling bar opening when the oven is properly leveled. The larry should then be filled with this amount for each oven. The operators should be cautioned to be sure there is no fire on the charging larry before it is put under the coal bunker for filling. If extreme caution is not exercised in this direction a serious fire in the coal bunker may result. The charging larry should not be left over the charging opening any longer than necessary. As soon as the coal is out of the larry it should be moved away from the oven. The leveling operation should continue until the oven is well leveled. During the charging operation the oven operating floor should be swept clean of all dust and spilled coal which may be swept into the oven before replacing the charging hole cover. A clean top floor is essential to prevent dust from falling into the flues during the inspection operation.

Changing Coking Time

While it is advisable to adhere to one definite coking time as much as possible it is necessary for some plants to make frequent and rapid changes in carbonizing speed in order to meet gas or coke demands. When such changes are made the heating operation must receive very close supervision in order to insure uniform coke and to prevent damage to the brickwork. Chart B gives a number of curves which make it possible to determine quickly gas and coke production which may be expected for various coking rates. Referring to Chart B, curve A gives the coal carbonized per day corresponding to the various number of charges per shift. Curve B shows the length of the carbonizing period corresponding to the various number of charges per shift. Curves C, D, E, and G show the gas make per day or hour with various yields corresponding to the number of charges per shift.

Foreman's Inspection

The oven foreman should be required to thoroughly

FOREMAN'S OVEN REPORT Date_____

Item	Description	Battery No.1	Battery No. 2
1	Temperatures: High		
2	Temperatures: Low		
3	Temperatures: Average		
4	Regulation (Collector Main Press)		
5	Stack Draft		
6	Prod. Gas Pressure		
7	Oven Gas Pressure		
8	Waste Heat Temp.		
9	Collec. Main Gas Temp.		
10	Prod. Gas Temp. on Chart		
11	Prod. Gas Temp: on Mercury Therm.		
12	Flush Liquor Pressure;Pusher Side		
13	Flush Liquor Pressure;Coke Side		
14	Ovens Decarbonized and Inspected		
15	Fuel and Producer Gas Vents and Safety Valves Inspected		
16	Dilution Meters Inspected		
17	Dil. Press. Gauges Inspected		
18	Reversing Machines Inspected		
19	Reversing Mach.Air Motors Tested		
20	Reversing Air Signal Whistles "		
21	Reversing Machines rods, chains & Cables Inspected		
	Reversing Machine Interlock Insp.		
22	Decarbonizing Machine Inspected		
23	Collec. Mains Tested for Pitch (Tues. & Fri.) 7-3 Shift		
24	Prod.Gas Main Water Seals Inspected		
25	Fuel Gas Drains Tested		
26	Pusher Air Motors Tested Under Load		
27	Von Ackeran Gov. Inspected		
28	Northwestern Gov. Inspected		
29	Fuel Gas Meter Reading		
30	Thomas Calorimeter Inspected		
31	Fire Extinguishers in Place		
32	Emergency Search Lights in Place		
33	Emergency Blankets in Place		
34	Prod. Gas Butterfly Valve Tried		
35	Holder Signals Tested		
36	Steam Syphons on Holder Inspected		
37	Holder Water Seal Inspected		
38	Spare Machines Tried		

Signed _____

Chart A; Report Blank

inspect the battery at least once a shift. Chart A shows the type of report blank used at Rochester which covers the foreman's inspection. Each foreman is required to turn in a similar report properly filled out at the end of his shift. A brief explanation of each item of inspection which is not self-explanatory follows:

1. Altho flue temperature determinations are usually made by the heater, the battery foreman should know the range of flue temperatures at all times. He is therefore required to record on his report the high, low and average flue temperature of each battery.—Items 1 to 3.

2. Items 4 to 13 cover the inspection of temperature and pressure conditions thruout the battery and are self-explanatory.

3. When operating on a fast carbonizing schedule it is often advisable to arrange a schedule of systematic oven inspection and cleaning which will insure that each oven is thoroughly inspected by one of the battery foremen once a week. This inspection should consist of a thorough checking of: the oven brickwork for necessary repairs or presence of carbon; offtake pipes, doors and jams for need of cleaning. If carbon is present or it is found that the door and jam cleaning has been neglected on any ovens, they should be left open long enough to put into good operating condition. Such a system prevents oven defects escaping attention for any length of time without working serious hardship on any one man. At Rochester for instance, there are three batteries of a total of 97 ovens. Each shift is responsible for the inspection of five ovens per shift. Item 14 covers the inspection.

4. Item 15 covers the inspection of the producer gas safety valves which should be in working order at all times and the fuel gas vents which should be ready for use in case it is necessary to purge the fuel gas main.

Inspection of Emergency Air Motor

5. Item 19 covers the inspection and testing of the emergency air motor for each reversing machine. It is advisable to operate the reversing machine with the air motor at least once a week.

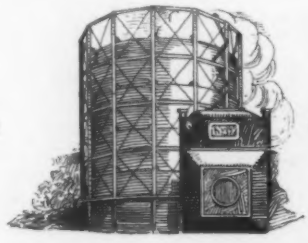
6. The collecting mains should be tested as indicated in Item 23 for pitch accumulation at least once a week. If pitch deposits are found they should be loosened and removed in the pitch trap. It is very essential that the pitch trap be cleaned daily as an accumulation at this point may plug the flush liquor return line, causing liquor to build up in the collector main and run onto the battery or possibly into the ovens.

7. The pusher ram air motor should be tested under load once a shift, as indicated in item 26, in order to insure that it is in working order at all times. This is done by running out the ram a few feet under its own power and then withdrawing it by means of the air motor.

8. Items 31 to 33 cover the inspection of all emergency equipment which should always be available and in condition for use when needed.

9. It is a good practice to operate all spare equipment at the beginning of each shift so that any necessary repairs may be made, thus insuring that the spare equipment is ready for use in case of failure of the regular operating machinery.

If these general instructions are conscientiously followed, smooth and efficient oven operation should result.



Central Gas Heating Appliance Installation

W. E. STARK

Research Engineer, The Bryant Heater & Mfg. Company

A BOILER or a furnace is only a part of the complete heating system. For the successful operation of the system, the different parts must cooperate. To insure that cooperation they must have been initially installed so that they are in proper relation, one to the other. Fuel supply line, heat generator, heat distributing system, chimney, and even the boiler or furnace room itself, all have their particular functions in attaining the ultimate result, —successful operation. Proper attention to the details of all parts of the installation, as well as to the heat generator itself, will stop many troubles before they are started. This does not by any means require that an involved engineering survey be made prior to the installation of the gas-burning heating appliance. Such a necessity does not exist, nor is the necessary time available. All that is required is knowledge of a few fundamental principles of installation, together with the exercising of ordinary common sense.

Gas Supply Must Be Adequate

First of all, an adequate supply of gas must reach the appliance. This requires a fuel pipe of adequate size, together with sufficient pressure to force the fuel through the pipe. The usual gas burning boiler, furnace, or burner, is designed to operate at a pressure of about two to two and one-half inches of water in the pipe or manifold to which the burner cocks are attached. The higher figure is conducive to superior operation. In an A. G. A. approved appliance, a pressure drop of one-inch (one and one-half inches in the case of very large appliances) is permitted in the entire line of controls, including the burner cocks. The pressure drop in the burner cock (referred to gas having a heat value of 500 B.t.u. per cubic foot and a specific gravity of 0.60) is usually on the order of three-tenths of an inch. This leaves out of the original pressure drop allowance of one inch; a permissible drop of seven-tenths through the remainder of the controls; regulator, automatic gas valve, and hand-operated shut-off valve. Adding this to the two and one-half inches desirable in the burner manifold, we have three and two-tenths inches as the desirable minimum pressure at the entrance of the controls that are a part of the heating installation.

This desirable minimum pressure then establishes the pressure drop allowable in the line serving the appliance, including the drop in the meter. Table I below shows the size of gas supply line necessary to provide an adequate supply of gas to the appliance for pressures of four, five and six inches at the meter inlet.

TABLE 1

Capacities of Various Sizes of Fuel Lines for 100 Ft. of Equivalent Length

Pipe Size (ins.)	4 ins. Inlet Pr. 0.45 S.G.	0.55 S.G.	0.65 S.G.	5 ins. Inlet Pr. 0.45 S.G.	0.55 S.G.	0.65 S.G.	6 ins. Inlet Pr. 0.45 S.G.	0.55 S.G.	0.65 S.G.
¾	81	73	67	173	155	143	209	188	173
1	191	173	160	407	368	341	493	446	413
1¼	334	302	279	731	643	594	861	779	720
1½	537	486	449	1144	1035	956	1385	1254	1158
2	1099	985	910	2341	2098	1938	2835	2541	2348
2½	1740	1557	1440	3700	3320	3060	4490	4010	3710
3	3048	2756	2547	6492	5860	5425	7863	7110	6571

In Table 1, the capacities are given for a run having an equivalent length of 100 ft. By "equivalent length" is meant the length of straight pipe corrected for the added friction due to valves and fittings. To determine the equivalent length add to the measured length the following allowances (in feet) for the various fittings:

TABLE 1-a

Diameter of Pipe, ins.	1	1¼	1½	2	2½	3
Globe Valves	2	3	4	7	10	13
Ells and tees	2	2½	3	5	7	9

For equivalent lengths other than 100 feet, the gas carrying capacity varies inversely as the square root of the length. For example, if the capacity of 100 feet of pipe is 100 cubic feet per hour, the capacity of 400 feet of pipe equals

$$100 \times \sqrt{\frac{100}{400}} = 100 \times \tfrac{1}{2} = 50$$

For gravities other than those given, the capacity varies inversely as the square root of the gravity.

Conserving Pressure

As little as possible of the available pressure drop should be used up in the line serving the appliance. In other words, the line should be oversize rather than undersize. The greater the pressure at the gas pressure regulator inlet—within reasonable limits, of course—the more satisfactory will be the operation of the regulator under conditions of variable pressure. Needless to say, every gas burning appliance consuming large volumes of gas should be provided with a gas pressure regulator. A regulator is a standard part of practically all boilers, furnaces, and conversion burners. It is only by the use of a regulator that the appliance can be kept operating at its most economical input.

It is equally needless to say that the gas line should be so laid out that the minimum opportunity exists for fluids to become trapped. It is particularly essential that there be no traps in the pilot line, or that there be no possibility of fluid from the main supply draining into a pilot line. Such a condition is guarded against in the design of all well-known boilers, furnaces, and conversion burners. If allowed to arise for any reason, it is bound to cause service calls. Accumulations of fluid in the supply line are indicated by the usual symptom, a rising and falling flame.

Every man having to do with gas, or with combustion of any fuel, knows that the gas or other fuel does not in itself possess any ability to burn. In order to ignite and sustain combustion, it must be provided with a proper supply of oxygen, carried, of course, by the air. In spite of the fact that this is a known fact, it seems

to be forgotten a surprising number of times. The result may be a variety of troubles.

The usual gas requires for its complete combustion about one cubic foot of air for each 110 B.t.u. of heat contained in it. This is the theoretical requirement. Actually, however, an excess of air must be supplied for the proper combustion of gas. About the minimum amount of excess air that is compatible with complete combustion is thirty per cent. Any less will as a rule result in incomplete combustion with consequent formation of carbon monoxide. Thus, each 110 B.t.u. of heat in the gas requires at least one and three-tenths cubic feet of air for combustion, or at the rate of one cubic foot of air for each 85 B.t.u.

In addition to the requirement for combustion, a certain amount of air is required for boiler room ventilation and cooling, as well as to meet the need for air to be drawn into the chimney through the draft check to equalize and moderate the draft exerted by the chimney on the appliance. It can probably be safely said the total air requirement instead of being one cubic foot for each 110 B.t.u. of heat value in the gas burned, becomes one and three-quarter cubic feet for each 110 B.t.u., an excess of seventy-five per cent, or approximately one cubic foot for each 60 B.t.u.

Air Requirements

Table 2 shows the air required per hour for gas burning heating appliances of various ratings. It can readily be seen that for large capacity heating plants the air requirement reaches a truly large figure, or an amount of air which cannot possibly find entrance through the cracks about windows and doors. In such installations positive provision must be made for the admission of adequate amounts of air, in the form of deliberately opened windows and doors, or, best of all, openings which cannot be closed. If open windows or doors are depended upon for the air supply to large capacity heating plants, they will be found closed more often than open.

TABLE 2

Air Requirements for Gas Burning Heating Appliances

A. G. A. Ratings		B.t.u. Input	Air Reqd.
Steam	Water	M per Hr.	(C. F. H.)
200	320	60	1000
250	400	75	1250
300	480	90	1500
350	560	105	1750
400	640	120	2000
500	800	150	2500
600	960	180	3000
700	1120	210	3250
800	1280	240	4000
1000	1600	300	5000
1500	2400	450	7500
2000	3200	600	10000
3000	4800	900	15000
5000	8000	1500	25000
10000	16000	3000	50000

Some of the symptoms of inadequate air supply are:

(1) Over-heated boiler or furnace room. (Complete elimination of radiation loss is impossible)

(2) Floating, wavering, smoky or "sickly yellow" flame.

(3) Over-heated plate work about base of appliance or in the doors.

(4) Spilling of products of combustion through the openings in the draft check with consequent vitiation of air.

(5) Noisy and back-firing burners.

The remedy is obvious. Very rarely, peculiar situations may require the construction of ducts to lead the air supply close to the appliance. An instance is the case of boilers located in a deep and narrow pit, a situation possible only in the case of gas boilers, and occasionally encountered.

Another situation that interferes with proper air supply to the appliances, occasionally met with in such buildings as hotels and large restaurants, is the proximity of a ventilating fan, so located that it exerts a suction in the heating appliance room. But little suction is needed to overcome the draft exerted by the chimney, and the result is disastrous to appliance operation. Obvious though the cause of the trouble may be, once after the trouble sets in, such conditions have more than once escaped the eyes of the responsible heating engineers or contractors.

Here we have two very simple things, which have a direct bearing on gas-burning heating appliance operation; gas supply and air supply. It takes but little time and no abstruse engineering knowledge to make an initial check of those conditions. Nothing but common sense is involved, and a few minutes spent in exercising that common sense may be well repaid later on.

Importance of Chimney

A highly important part of the installation is the chimney. The chimney is not needed so much to draw the products of combustion out of the appliance as it is to draw the products of combustion out of, and the air into, the boiler or furnace room. Bear in mind that gas-burning appliances require but little draft for their successful operation. They would perform with safety and efficiency if set in an open room, without a chimney connection direct to the appliance, providing only that means existed to facilitate the ready escape of the products of combustion from the room. Indeed, boilers and furnaces, as well as many conversion burner installations, are installed with draft checks, or so-called "draft hoods," which practically prevent the chimney from exerting any direct effect on the appliance itself. The chimney acts merely as a vent, which takes the products of combustion after they have been discharged by the appliance, and vents them to outdoors. The chimney is not required to exert any pull on the appliance; it is merely required to exert sufficient draft to draw the air for combustion into the boiler room, the products into itself, and to overcome its own internal friction.

The ideal condition would be if the salesman or engineer having to do with the installation of gas-burning heating appliances, encountered only chimneys that were built with the deliberate intention of using them with gaseous fuel. He must, however, take his chimneys as he finds them, and make the best of the situation. In most instances the situation is not at all bad.

Gas has an effect on chimneys different from that of other fuels only because of the water vapor that is present in the products of combustion, and then only if there is present in that water vapor any matter that is destructive to the materials out of which chimneys are usually made. Manufactured gas frequently contains an appreciable amount of sulphur, present in the form of organic sulphur, impossible of complete removal in the gas making process. This burns to sulphur trioxide (SO_3), instead of to sulphur dioxide (SO_2), due to the presence of iron oxide on the heating surface, which acts as a catalyst. Condensation of the water vapor in the products of combustion,—possible if the flue gas temperature is sufficiently low, and aggravated by poor chimney construction, particularly in the case of an outside chimney,—results in the formation of a dilute solution

of sulphurous acid, which may oxidize to sulphuric acid. If the concentration of sulphurous or sulphuric acid is sufficiently high, it may attack the exposed mortar of unlined chimneys, resulting in partial disintegration and leakage.

Natural Gas Not Detrimental to Chimney

Natural gas, which rarely contains any more than the merest trace of sulphur, has but little effect on chimneys. True, condensing water vapor may seep through porous mortar, but the seepage will be no greater in degree than that of an equal amount of rain water, driven down a chimney top by a driving rain. Mixed gases, containing a considerable percentage of natural gas will have but little effect on the chimney construction.

Modern chimney construction, following the specifications laid down in the Standard Ordinance for Chimney Construction of the National Board of Fire Underwriters, is altogether suitable for gas burning installations. This ordinance requires fire clay linings, set in cement mortar, with the space between brick and tile filled with mortar. Complete filling of this space is insured by building the masonry around each section of lining as it is placed.

In some localities it may be necessary, on account of the characteristics of the gas, to line existing unlined chimneys when the use of gas as a fuel is instituted. Practice as to lining material varies. Ordinary fire clay tile linings, aluminum, corrosion resisting steels, and glazed sewer tile have been used. One gas company doing a great deal of house heating, employs sewer tile, packing the joints with lead wool. It is said that seventy pounds of lead wool are sufficient for a forty-foot chimney.

So-called "chimney trouble," that is, seepage or disintegration due to moisture, is often caused or aggravated by insufficient chimney draft, or chimneys of inadequate height or excess area, and may many times be avoided by much less expensive measures than lining. The larger the amount of air that can be mixed with the flue gas in the chimney, the greater its moisture carrying capacity becomes, and consequently, the less the tendency for condensation becomes. From that statement the following helpful facts may be deduced:

(a) Admission of basement air, such as through an open clean-out door, will reduce condensation of water vapor in a chimney.

(b) Increasing the height of a chimney, thus increasing the draft produced, will draw in added air through such an opening, or through a draft check, thus reducing the tendency for condensation.

(c) When a chimney is of adequate height, but quite oversize in cross-section, the admission of basement air through an opening made for the purpose will dilute the water vapor-bearing gas that tends to stagnate in the corners, with consequent condensation.

For a chimney that is actually inadequate in cross-section, the only remedy is increased height, sufficient to bring the capacity up to the required capacity, or to provide a larger chimney.

Table 3 shows the required areas of chimneys for gas-burning heating appliances, for various hourly B.t.u. consumptions, and A.G.A. steam and hot water ratings.

TABLE 3

Minimum Areas of Rectangular Chimneys (Sq. Ins.)

	A. G. A. Steam Rating of Boiler														
	200	250	300	350	400	500	600	700	800	1000	1500	2000	3000	5000	10000
Height	A. G. A. Water Rating of Boiler														
of	320	400	480	560	640	800	960	1120	1280	1600	2400	3200	4800	8000	16000
Chimney	Hourly B.t.u. Input to Boiler or Furnace (Thousands)														
(ft.)	60	75	90	105	120	150	180	210	240	300	450	600	900	1500	3000
20	18	19	21	23	25	29	34	38	41	49	66	82	114	172	317
30	17	18	20	22	24	28	33	37	40	48	60	80	111	169	314
40	16	17	19	21	23	27	31	35	39	46	62	78	108	165	308
50	16	17	19	20	22	26	30	34	38	45	61	76	106	162	302
60	15	16	18	19	21	25	29	33	37	43	59	74	103	158	296
80	14	15	17	19	20	24	28	31	34	41	56	69	97	149	279
100	13	14	16	18	19	22	26	29	32	39	53	66	91	136	249

Guards for Mental Hazards

IT has become a habit for safety men to rush into action whenever they encounter a gear, an excavation, or any other physical hazard which has not been duly and thoroughly guarded. A great deal of time and ingenuity has been expended in the design of the best possible guards and lots of money has been spent on the construction and installation of these guards. The work has been done so well that physical hazards have almost passed out of the picture as causes of personal injury.

A study of personal injuries in typical utility organizations indicates that inattention, poor judgment, and haste are the most prolific causes of lost-time injuries, while the men most frequently injured are of the type which could hardly be classified as highly skilled labor. In other words, most of our personal injuries are not due to deliberately wrong thinking, but to a failure to think, or to think properly.

There are automatic guards against hazards of this kind. These guards are called habits. If we can get our men into the habit of doing things in the safe way, we can cease to worry whether the men will or can think. The addresses on "Psychology and Safety," by Dr. Melrose, at the Pittsburgh Safety Congress, represented the opening gun in a campaign which should be fought through to a conclusion. It will be a long, hard fight, and persistence and courage will be required, but the fight will be well worth carrying on. The victors will have progressed a long way toward our ultimate goal, the elimination of unnecessary personal injuries.

—*National Safety Council.*

The Gas Conversion Burner

N. T. BRANCHE

Engineer, Chg. Househeating Development, Surface Combustion Corp.

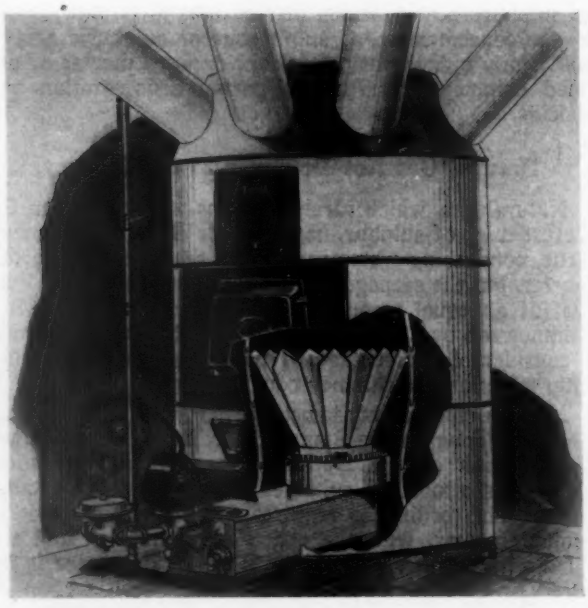
IN dealing with the subject of gas conversion burners today, it is very difficult to discuss the matter in a logical manner until we are sure that both parties concerned are basing their criticisms and reactions on the performance of the same type of conversion burner. Unfortunately, conversion burners are today often classed as a group in which no distinctions can be drawn and on which much stigma of past uneconomical performance rests. Such however, is not the case for those who have had contact with the growth and development of the modern gas conversion burners which are so rapidly coming into general usage.

The conversion burner of yesterday was sold through the multitude of plumber's shops and hardware stores who deal in such equipment. It was a poorly constructed, usually manually operated, inefficient piece of equipment. Usually so designed that it gave one large flame with no attempt made to utilize the basic principles of atmospheric burner equipment or to adopt this particular piece of equipment to the coal boilers and furnaces in which it was to be placed.

Previous Status

It is probable that this one feature, mainly that of adapting a gas burner to fit the needs of a coal boiler, has been the reason for the rapid growth and successful operation of the later day automatic conversion burners. Many individuals have undoubtedly not considered the gas conversion burner in a favorable manner, basing such criticisms on the performance of a particular type or style of conversion burner which they have been acquainted with in the past. Or the fact that they considered conversions in general as an inefficient piece of apparatus, usurping the rightful sales of gas designed boilers or furnaces which are in their estimation the type of gas heating equipment which should be sold. It is noteworthy at this point to bring attention to the fact that in a midwestern city where conversions and gas fired furnaces and boilers are both handled and the gas rate is very low permitting ample latitude in competition with other types of fuel, the conversion burners sold equalled 90% of the total number of gas fired installations sold. In the progress made lately with these burners, it is well to compare in mind point by point the features of operation and design of both classes of equipment as marketed today in order to determine just what has entered into this situation to have revivified it in the last three years to the extent in which it has been.

Three years ago it was felt that the conversion burner was inferior and not to be considered by the gas companies. In those territories where efficiency did not enter into the picture at all the prevailing rate was so low that any type of equipment was satisfactory. The successful completion of several hundred automatic conversion burners during the heating season of 1926 and 1927 showed that with proper precautions in the design and construction of this equipment very efficient results could be obtained in the average home. The conversion burner is a logical step toward establishing gas as domestic heating fuel. It is probable that the majority of new homes for another generation at least will be equipped for coal firing and naturally the logical continuation of conversion burner sales will follow. No one make of heating plant of the coal type has ever satisfied the public in general and it is logical no one type of gas heating will satisfy every one. The tendency toward air conditioning today bids rapidly to replace the past popularity of steam heat in the larger homes, and it is to be expected that developments along this line will shortly follow.



Janitrol x-2 Burner Installed in Warm Air Furnace

Efficiency

Unfortunately, the question of efficiency has clouded the horizon of this easily obtained domestic load. Most of the discussions which have centered around conversion burners have been over this issue of efficiency and how efficiencies may be obtained. However, it should be known that any of the several leading makes of conversion burners in a boiler of average size and construction will give an efficiency of 78 to 85 per cent. This has been proven to the satisfaction of many of the leading gas companies of the country in their own laboratories by tests conducted by themselves. It is also frequently stated that these efficiencies are all very well but are the results of tuning up the burners and tinkering with adjustments, squeezing the last B.T.U. possible out of the heat balance.

This may have been true in the early days prior to the time of the completely automatic unit of today, but today it would be rare indeed to find a conversion burner in the field, which has usually been set by visual adjustment to a neutral draft at the fire door (by means of a lighted

match) that would not run less than 8% oxygen by Orsat analysis giving a flue loss not exceeding 25%. Effort shall be made to explain in brief form the factors which have contributed to this successful operation.

Burner Principles Adapted to Coal Boilers

Hereafter in this discussion wherever the word "boiler" is used it is meant to embrace also warm air furnaces and is used merely to summarize the several different types of heating equipment which are coal fired.

All coal fired heating equipment is designed around a definite grate area. Such a grate area allows the consumption of just so many pounds of coal per square foot per hour. This figure, for different types of fuel and more or less care in firing, will vary from 5 to 10 pounds; a safe average often used is 6 pounds per square foot per hour. In relationship with this grate are the direct heating surfaces of the combustion chamber. In other words, the surfaces on which the glowing bed of coals radiates heat. Above this, there is, also in relationship to the grate area a given amount of indirect heating surface which is so designed to absorb the remaining heat in the flue gases of the coal combustion which is being carried off as sensible heat. Thus in practice with coal firing there is:

1. A definite grate area on which the boiler rating is based.
2. A percentage of the total heat being given off as radiant heat, to the direct heating surfaces of the fire box.
3. The balance of the heat being carried off as sensible heat in the flue gases through these indirect passes to the stack.

In a gas designed boiler it is the practice to build a boiler with practically a 100% indirect heating surface. In other words, the gas is burnt as quickly as possible, the total amount of heat being converted into sensible heat in the flue gases and this sensible heat then wiped out by the large heating surfaces over which these flue gases must pass. Unfortunatly, such a large heating surface is just as efficient a cooling surface during the off periods, as it is a heating surface during the on periods and it is this one factor which has done much to level off the comparative efficiencies between coal designed equipment with a radiant type of conversion burner as compared to the gas designed boiler. These large heating surfaces, subjected to the flow of cool secondary air during the off period naturally cool as effectively as they heated, since the operation is comparable in every way.

Therefore, when coal fired furnaces are converted to gas our first thought is to obtain complete combustion with as little sensible heat as possible. This combustion must then be converted, to as great an extent as possible, to radiant heat immediately, being allowed to reflect on the direct heating surfaces in a manner comparable to that of coal firing. Flue gases then leave the top of the combustion chamber for the indirect passes or surfaces, containing less heat, by far, than is the case if there were no radiant material for the flame to play upon and were dependent on nothing but an open flame.

It is necessary also to stay within the limitation of the indirect heating surface as provided for coal, insuring that the products of combustion are not diluted with excess air which would increase their volume and lower their temperature and that our combustion is completed before coming in contact with the cold surfaces of the boiler.

In order to insure the full benefits of the fire box walls or direct heating surfaces it is necessary to divert the gases against them immediately after combustion is completed. Fortunately by using inclined baffles over the burner flames, leaning outwards against the fire box or combustion chamber wall, several things are accomplished with one piece of equipment.

First, a radiant surface is supplied immediately above the flame which has the tendency to throw off the radiant heat to the side walls.

Second, this radiant surface greatly hastens the combustion similar to the method in which refractory tunnels and beds are used in industrial gas furnaces to rapidly complete combustion in a small space.

Third, these baffles deflect and divert the flue gases which are rising up around them out against the side walls where these flue gases at their highest temperature are brought into intimate contact with the side walls of the boiler at the point of exit from the baffles.

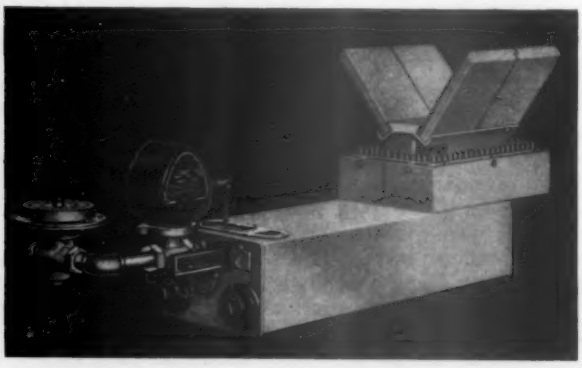
The Atmospheric Burner as a Conversion Burner

Such a method of combustion in a circular furnace leads to a ring type atmospheric burner in the center of which is the necessary support for the baffles which are leaning out against the side wall. It has been stated previously that combustion should be completed as rapidly as possible before touching the cold side walls and forming CO which would be the result of this flame playing upon a cold surface. To accomplish this rapid combustion in the small space available has led to very careful developments of atmospheric type burners which are particularly adapted to handle large quantities of gas in an efficient manner. The injection of primary air has been obtained with the usual adjustable orifice and the venturi throat similar to the one recommended by the Bureau of Standards as a result of their extensive tests on this type of equipment. However, it has been found by experience that certain factors enter into the design of this equipment which are divergent from the results found by the Bureau of Standards in the proportioning of throat and port area.

By using a gas pressure regulator and the adjustable orifice mentioned the maximum pressure is utilized at all times to entrain primary air. In other words the burner could have been adjusted to give satisfactoy flame characteristics and then the capacity or demand varied by means of a valve between the regulator and the orifice. This however, would have resulted in lower pressure on the orifices and less primary air entrainment. Proper ratio of throat to burner port area and the design of all bends, turns and corners in the venturi and burner heads to offer as little restriction or resistance as possible to the flow of the mixture has had a greater effect on primary air entrainment probably than any other feature.

Many of the earlier conversion burners took no account of the secondary air necessary for combustion or the extreme necessity of insuring its rapid intermingling with the burner flames at its base to insure complete combustion in as short a space as possible. Nearly all modern burners are equipped with raised ports to allow parallel upward flow of this secondary air and the burning gases issuing from the port. By this means the secondary air is flowing and diffusing into the flame immediately on the issuance of the mixture from the burner ports. On the other hand, old and obsolete burner designs often had ports located a considerable distance from the edge of the burner and permitted no air to flow to the flame save at right angles to it, which of course resulted in an extremely long flame before complete intermingling and combustion had occurred. It is re-

markable indeed how small a change in the relationship of these features can cause considerable change in the character of combustion.



Janitrol Rectangular Type Burner for Rectangular Boilers

The second feature of the burners which has resulted in economical operation is the control of the secondary air. On the modern conversion burner it is customary to use a duct to conduct this secondary air into the burner heads and to release it only at the point of combustion so that there is assurance that all of the flow of air is direct to the point of combustion and not being diverted through the furnace at other points.

So far the points brought out have dealt with getting the gas properly burnt within the furnace and obtaining proper combustion and distribution of the flue gases to assure economical operation.

Modern Features

The following is an enumeration of some of the features which a successful modern conversion burner incorporates.

1. As just described it duplicates a coal fire condition in a furnace designed for coal.
2. It incorporates all the most modern engineering practice on atmospheric gas burner design giving complete combustion with a minimum of excess air.
3. It is fully automatic and here it is necessary to enumerate the features which are making it so acceptable to the public today and which have so associated the idea of automatic heat with gas as fuel.
   a. A room thermostat of plain or clock type which maintains with a remarkable degree of accuracy the house temperature.
   b. Electric motor valve opening and closing the gas supply line and secondary air door at the thermostat demand.
   c. Electric safety pilot so inserted in the circuit that the burner cannot be operated unless a satisfactory pilot flame is burning. A feature without which no central gas fired heating plant should be sold.
   d. Electric limit devices to protect the heating plant in the case of overload. These are so designed to shut the burner off if the steam pressure or hot water or air temperatures have risen above the point to which this limit control has been set.
   e. The complete control of secondary air to the burner and combustion zone. This one feature has led to more efficiency in operation than any other one improvement, because it has not only shut the secondary air off during the off period but has also drawn to the attention of the average installation man the fact that the size of the secondary air door opening required for average combustion is very much smaller than he would have formerly considered necessary. Thus we have to begin with little excess air in our combustion, and what we do have is immediately shut off at the end of the on period.

   It has been shown that with proper regulation and control of this secondary air that the flue losses may be reduced to as low as 15%, a figure verging on the ultimate that can be obtained without condensing the water vapor of the flue gas.
4. Of great importance to the gas industry, the construction and design permits long periods of satisfactory operation with a minimum of service, a feature which has contributed largely to the ability of gas companies to run extensive sales campaigns with limited service and installation personnel. In one instance, one man has been servicing 1100 conversion burners of a popular make. A record such as this is an indication of what a potential market for domestic gas heating can be obtained at relatively low service expense.

In addition to this recent conversion of a multitude of various types and makes of heating plants with a few sizes of burners is a feature which has disproven the earlier theory of many of the believers in gas designed boilers that a conversion burner was satisfactory only when installed in a particular style of boiler with an exceptionally large amount of heating surface in proportion to the load it carried.

(*Continued in April Issue*)

Insulation Effects Substantial Savings in Gas Househeating

AN impressive fuel saving in the case of an Asbury Park home was brought about by insulation applied after the house had been built for some years. This residence, a 2½ story wood frame structure with a clapboard exterior, has nine rooms, a bath, and upper and lower halls. The main part of the house is 20 ft. wide and 30 ft. deep. A fully enclosed sun porch measuring 8 ft. 6 in. wide by 32 ft. long extends across the front of the house with a 12

Insulation Saved Gas in this Home

ft. overhang on the east side. The sun porch has a northern exposure. An addition on the east side of the house runs back from the sun porch for a distance of 15 ft. from the front of the main part of the house. Both the sun porch and addition are one story in height.

The house is heated by a gas-fired hot water system with 463 sq. ft. of hot water radiation. Nine radiators are employed and an average temperature of 70 deg. F. is maintained throughout all rooms during the heating season. Before the house was insulated, the sun porch was heated independently by a large oil heater. The main portion of the house was heated with a total of 348 sq. ft. of hot water radiation. About the time the house was insulated, two radiators, with 115 sq. ft. of radiation surface, were placed in the sun porch and the oil heater was removed.

The insulation contractor completed his work early in the fall of 1929. The insulation was carefully blown in place* between the studding of all exterior walls excepting the front and two ends of the sun porch; these walls consist of masonry and hence could not be blown. The walls were filled with the insulation by inserting the blowing nozzle into small openings made from the outside by removing certain clapboards. Four inches of insulation were used throughout, with the exception of the roofs. The lean-to roofs over the sun porch and the addition were filled with from 3 in. to 4 in. of the insulation. In order to insulate the roof of the main house, sheets of J-M Insulating Board were nailed to the underside of the rafters and then the insulation was blown in the 5 in. space between the roof and the Insulating Board. The entire job covered a gross wall and roof area amounting to 3,718 sq. ft.

The gas used per year before the house was insulated averaged 272,500 cu. ft.; the cost was $242.53. In addition, the kerosene-fired sun porch heater was employed an average of 135 days per year, for which the fuel cost was $48.60; this cost, on the basis of cubic feet of space heated, was approximately in line with the cost of heating the rest of the house. The total former average cost of heating the house amounted to $291.13. When the house was insulated, the kerosene heater in the sun porch was replaced by 115 sq. ft. of hot water radiation. Hence the gas consumption per season after insulating—196,500 cu. ft.—includes the fuel to heat the sun porch. The annual saving in fuel costs amounts to $116.24,—a percentage reduction of 39.9% as shown in the tabulation below.

Season Heating	Ave. temp. for the season Oct.-May	Gas used per season (Cu. Ft.)	Ave. temp. Oct. to May for 48 year period	Gas used corrected to ave. temp. (Cu. Ft.)	Ave. gas used per season (Cu. Ft.)
(1)	(2)	(3)	(4)	(5)	(6)
1926-27	41.5 deg. F.	294,500	(44.4 deg. F.)	264,500	
1927-28	44.1 deg. F.	281,900	(44.4 deg. F.)	278,600	
1928-29	44.4 deg. F.	274,300	(44.4 deg. F.)	274,300	
				Without insulation—	272,500
1929-30	43.5 deg. F.	203,400	(44.4 deg. F.)	196,500	
				With insulation—	196,500

Seasonal fuel cost without insulation:		
Gas—272,500 cu. ft. of gas at $0.89 per thousand	$242.53	
Oil for porch heater—(Cost is in line with remainder of house on a volume basis)	48.60	
		$291.13
Seasonal fuel cost with insulation:		
Gas—196,500 cu. ft. of gas at $0.89 per thousand.... (The present gas cost includes the heating of the porch where radiators, heated by the main system have been installed.		$174.89
Annual saving in fuel costs		$116.24
Percentage reduction in annual fuel costs		39.9%

The insulation itself is estimated to last 25 years and more. In order to be conservative the investment of $760 is written off in 25 years, which means the cost per year is $30.40. Adding the average interest on the investment the total cost per year is $54.11, and subtracting this from the total annual saving of $116.24, the net yearly saving is $62.13.

In addition to the savings in fuel, it is worth mentioning that this home has been made cooler in Summer. Further, in the event the owner ever considers house-cooling by gas, his insulated home renders him a prospect par excellence.

*For details of insulating a home by this method see April 1930 issue of American Gas Journal, page 36, "Thermal Sieves and Gas House-heating."

A Striking Motto

MANY mottoes have been created by various Gas Companies; the most popular one for a while being undoubtedly, "You can do it Better with Gas."

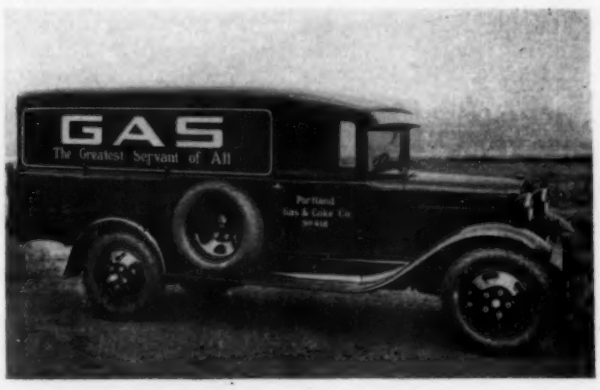
After using that motto and other ones from time to time, Portland, Ore., Gas & Coke Company finally hit on the following:

GAS
The Greatest Servant of All

After all, it is a question whether a statement to the effect that "you can do it better with Gas" convinces the beholder or converts the antagonist.

On the other hand, the statement that "Gas is the greatest Servant of all" calls forth less contradiction, for even though the reader may not like Gas for some purpose or other, he may feel that in spite of that, there may be other purposes for which Gas is indeed a boon.

As shown on the new trucks which are painted bright red, the new motto in white certainly stands out very strongly and thus far has borne the brunt of acquaintanceship better than any other motto the company has used. —*John H. Hartog.*



A matched kitchen, to conform with the modern trend of kitchens in coordinated colors, displayed by the Consolidated Gas Co. in New York City.

The major pieces, such as refrigerator, sink, cabinet and range, are finished in bisque. The walls and ceiling are a delicate grey-blue. The wainscoting of lavender tiling is banded at the top and bottom by a deep plum shade. The linoleum accents the pink-pearl.

Kitchen utensils, wire ware, pottery and curtains are in bright touches—in pink and blue.

Color Problems and Sales Stimulation

HAZEL H. ADLER

President, Taylor System, Inc.

GOOD taste has definitely entered the gas appliance industry and the successful merchandising of kitchen equipment demands a complete understanding of ultimate consumer taste. This fact is fully realized by both public utilities and appliance manufacturers, and because the Utility Company in its capacity as the middleman between manufacturer and ultimate consumer, is striving to meet the aesthetic tastes of the average American woman.

Not only is it necessary for the Utility Company to have definite data of consumer trends over the years with respect to any particular unit in kitchen equipment, (refrigerator, stove, cabinet and sink) but it must rely on scientific authoritative and intelligent advice on "style" coordination of all the units involved. Therefore, it would seem that to spur the manufacturer into action, the Utility Company must make the first move.

Style changes in kitchen equipment have been fast and furious. In an extremely short time, the old range has given way to another with oven heat control, insulation, broad burner tops, utensil drawers and the like, not to mention improved architectural design and color.

Absolute obsolescence is at the door of the old ice box, and the silent gas refrigerator should monarch the home refrigerating market.

Yet all these developments have missed the big thought. They have evaded the final issue—the consumer's conception of an ideal kitchen.

The consumer today wishes to buy a set of matched kitchen equipment just as she buys a set of dining room or bedroom furniture. Thus far due to the lack of intelligent co-operation between manufacturers of stoves, sinks, refrigerators and kitchen cabinets, the consumer has been unable to purchase two pieces of major kitchen equipment which match in color.

The word ensemble means "the whole" with all parts ensembled and matched. As used literally, it means all parts assembled harmoniously to give the perfect relationship in coordination of color and line.

To remedy the present, unstable condition, utility companies must get manufacturers to produce, on a sound merchandising basis, equipment in colors that will match with other related major pieces in the kitchen.

Utility companies, from now on must constructively guide the manufacturers in choosing salable colors and reducing unwieldy color lines, with a view of aiding the consumer in realizing her ideal of an attractive kitchen dictated by her good taste and judgment.

Color has style appeal, and where color is harmoniously used in approved taste, it combats sales resistance.

By furthering the agreement among manufacturers of kitchen equipment for color coordination, utility sales executives can expect a marked stimulation in sales and an added and profound interest in the products they are selling.

Since color has become as much of a competitive force as quality, brand, design, and price, it should be given its proper place in the sphere of commerce, with first consideration given to the consumer appeal.

As far back as four years ago, this consumer trend was recognized and, working hand in hand with manufacturers of related kitchen articles, steady progress has been made. A growing number of manufacturers of

kitchen articles have altered their production plans to permit them to participate in the general scheme. Today many products are being finished uniformly, as far as color is concerned.

The idea is that of producing major equipment in three certain shades of standard colors—Bisque, Silver Green, and Pewter Grey.

The pieces are purposely kept in neutral background tones so that bright accent colors, such as curtains, cooking utensils, oil cloths, etc., may be readily changed.

Innumerable color combinations can be evolved around these three standard architectural colors.

When a woman tires of her kitchen, she can repaint the walls, change the window curtains, and possibly alter the accent colors of her pots and pans, and she will have an entirely new color scheme at a minimum expense.

A woman, selecting her equipment on the foolproof basis of color harmony, is likely to overlook her personal preference for a certain make of range, refrigerator or whatnot, if it does not fit into her color picture.

The demand is just for color, but for color with intelligence behind it; color with restraint; a complete picture or ensemble, a combination of different colors each one falling into its proper place, in relation to the other colors, the individual ingredients carefully measured in scientific proportion in order to make it a complete whole.

All three colors are new kitchen colors. The Silver Green is a soft green which blends pleasantly with gay tones in kitchen utensils, oil cloth shelving, and curtains. It is an excellent "background" which is a fundamental requirement of a color to be used in permanent equipment. The selection of silver green equipment is particularly advisable for small kitchens, as it tends to make the large articles of equipment less obtrusive, and makes the kitchen appear more spacious. It is a restful color and one which is sympathetic with practically all bright contrasting hues, enabling many harmonious changes in kitchen accessories.

The Pewter Grey is a warm tannish grey, which is sufficiently neutral to provide an excellent background for bright spots of color and at the same time, eliminate the drab and unfriendly atmosphere associated with the usual colder and bluer greys. Properly contrasted with gay peasant colorings it emanates a cozy hospitable atmosphere.

The Bisque, a mellow buff tone, is also an authoritative kitchen equipment color. It is characterized by its earthenware quality, so appropriate for the kitchen, and tends to depart from the much abused ivory. It is an excellent background color and like Silver Green and Pewter Grey, easily adapted to bright accents—restful and yet effective, and above all, livable.

Utility Companies should cooperate for the promotion of model matched kitchens for the benefit of the industries involved. These model kitchens create widespread attention, because they are basically right and reflect the consumer desire and trend.

They demonstrate in one sweep of the eye, the beauty and charm of the "ideal" kitchen every woman hopes to have in her home.

They point to advanced smart trends rather than repeating the hackneyed color scheme and decorative ideas with which women are already too familiar.

Moreover, these colors will be lastingly pleasing, because they are in approved good taste, and are not subject to passing whims and fancies.

They can be safely estimated to hold the public's favor for many years to come.

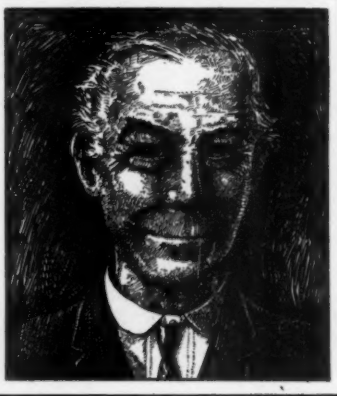
Utility Companies have kept abreast of the times in every way except one—convincing the undecided customer in the matter of choice of color harmony in the kitchen.

This final and most important step is yet to be taken.

Modern peasant type kitchen in Taylor coordinated colors displayed by Public Service of New Jersey in Newark. The major pieces of equipment—stove, sink, cabinet and refrigerator—are in silver green. The woodwork, chairs and floor are of buffstone. The accents are in the curtains, shelving, clock and utensils, in tangerine, apple green and yellow. The walls are a pale bisque.

To give the peasant feature of decoration, enamel ware, wire ware, and pottery are placed on a ledge or hung on the wall. The curtains form a strong accent, having a small, but bright floral design.

Letters from a Gas House Terrier to His Grandson



DEAR SAM:

Your last letter reminds me some of that guy Alexander th' school books used to tell about. The time he was found settin' on th' curb hollerin' for a little service in respect to fetchin' him more worlds to conquer. By his own admission, he had done licked everybody, and it still wasn't near time for him to go home.

But of course his real trouble was ignorance. He hadn't never heart of Texas, Hells Kitchen, or Cicero, Illinois. Even then, as now, there was prob'bly boys in all them places that would have been glad to accommodate him.

So you say they ain't many new fields for th' gas man to conquer? That th' job's too near done to keep a' up-and-comer like yourself on his toes, eh! These days, you've got to run as fast as you can all the time in order just to stand still. If you slow down for long enough even to pat yourself on th' back and congratulate th' boss on bein' bright enough to hire you, you'll either lose ground or lose sight of somethin'.

Like a picture I seen once of one of these big gasoline-deliverin' trucks. It was stalled on a lonely country road, with the driver pokin' worried-lookin' in the truck's own tank with a stick that had come out dry. It was labelled "Out of Gas!" That driver was so close to the hundreds of gallons of gasoline he was delivering that it never even occurred to him to tap the big tank for some!

Some of th' gas boys are th' same way. They're so close to their own product that they don't even see their whole load. What I means is, they've been beatin' a big drum all up an' down th' alley about house-heatin', industrial load, refriggyeattion, and th' like, until their own dust an' noise has blinded them to th' fact that they've actually lost ground, in many cases, in th' consumption of gas in th' kitchens on their mains. They've forgot that holdin' an old user is as important as shovin' th' dotted line in front of a new one. They've been so busy braggin' about what they're doin' to th' coal dealer, that th' electric range manufacturer has slipped into th' adjoinin' kitchen durin' th' uproar and kidnapped their oldest child, th' cookin' load!

Which leads up to another mistake that a man that can read often makes, and that is takin' too serious' all the smart cracks about women in the funny weeklies. Also the solemn articles writ at so much a word (which was *why* they was writ, in a lot of cases!) about th' decline of th' great American home. Until, after a perusal of some of them, a bright young lad in th' gas bus'ness has been known to tear up a batch of gas range prospect cards because he has just read that home-cookin' will soon be as extinct as fur coats in the Congo. That we are enterin' a New Era in which preparin' a meal will shortly be confined to a hurried stopover at th' bakery or delicatessen on th' way back from th' bridge game.

Don't you believe it, Sam! In th' first place, all gas companies aint confined to the big cities—not by a durned sight. And there's a heap of small-town husbands, as well as the city ones, that aint goin' to dig a ditch or run a store on three olives a sack of potato chips, and a half helpin' of harmless-dyed French pastry. No, sir; the work of this country is still bein' done on buckwheat cakes, French-fried potatoes, and roast beef, medium. And some women is still got to cook 'em, even if she won't eat 'em.

Women might get the vote, and his last cent, out of a man; but even Carrie Nation couldn't get him to give up his habit of three hot meals a day.

Which bein' th' case, the real idee is that it aint enough just to go around chirpin' Cook with Gas. It's a good slogan but a poor closing argument. You've got to be as specific as a photograph. You've got to be sure she's thinking about the kind of stove you're talkin' to her about. Maybe she's still got in mind th' old Grover Cleveland models, with open-air burners and th' oven temperature controlled by manual labor at th' pet-cocks. Maybe she's got an electric range manyfacturer's booklet back of her clock right now, tellin' how his product will do everything but put out th' cat at night. And she not knowin' that th' new model gas stoves meet him point for point, from insulation to oven-control. But she can't be sold 'til she's told—by th' gas man.

And ther's another point to this cookin'—an' th' whole domestic gas load, for that matter. And that is that gettin' a small customer aint so liable to make you have to increase th' office force an' th' overhead on his account. But losin' him aint so liable to make th' bookkeepers have to take th' stopper out of th' red ink bottle, either. For it's when th' big industrial user shuts down that you may have to rush in a few shock absorbers between that event and the stockholders.

By which, of course, I ain't decryin' th' big industrial users. No man in th's gas bus'ness will rush around faster'n me fetchin' him ice-water, fans, an' th' evenin' paper when he drops in to visit. We need 'em, an' want 'em, and there'll be more of 'em every year as they find out what gas can and will do for 'em. But what I want to put over, son, is that all customers are impor-

tant. Especially this year. And that every home's a prospect until they're heatin', cookin' freezin', water-heatin', ironin' laundry an' garbage-burnin' with gas.

And by that time th' oldest daughter's liable to be startin' out for th' evenin's entertainment at about the same hour th' orchestry was playin' "Home Sweet Home" in my day; with a ring on her finger and a look in her eye that indickates it aint far off 'til you're due to start in tellin' *her* that gas is th' best way to cook an' th' best way to heat th' baby's bottle. For th' generations overlap, son. Which is why, like woman's, the gas man's work is never done in fact, long before you've ever been able to get around to all th' potential bus'ness in appliances that's layin' about unnoticed waitin' for a sharp-eyed lad like yourself to see it, more ways to use gas—like air-coolin' homes in summer—will be comin' along to disturb your rest and shove you up the ladder toward bein' a *real* gas man!

Yours for openin' your eyes an' closin' your sales.

Monoxide Mike

Gas from a Mile and a Half Below the Earth's Surface

(*Continued from page 35*)

Laying of the 12-inch main from the wells to San Angelo is expected to begin immediately, with work starting at the same time on an 8-inch line to Girvin.

What effect the new line will have on the present supply has not yet been determined. It is believed, however, that the gas from Coleman County fields will be routed in another direction and that Miles, Rowena, Ballinger and Winters, now served from Coleman County, in the future will get their gas from the deep wells of Reagan County. In that event additional boosting stations would necessarily be built, as little pressure is now required to bring the gas from Coleman County which is lower in elevation than San Angelo, while the Reagan County pool is higher. Thus, more force would be required to bring the gas to San Angelo from Reagan County.

Two casinghead gasoline plants at Texon now extract gasoline from the gas of the Big Lake wells, but the residue gas is wasted. It is that gas that is to be piped to San Angelo and Girvin. The gas now supplying the city is from wells from which little gasoline might be extracted. One plant is extracting 30,000 gallons of gasoline daily from around 60,000,000 cubic feet of gas from the deep wells, and the other approximately 20,000 gallons of gasoline daily from 3,500,000 to 4,000,000 cubic feet of sour gas that comes from the wells in the 2,400 and 2,900-3,000-foot levels and from the vapor from all its tanks. The gasoline recovery from this gas is much higher than from the deep producers, averaging around five gallons to 1,000 cubic feet of gas. The plant that handles this product is a combination condensing and absorption plant.

The area so far proven producing from the 8,500-foot level is small compared with the proven acreage of the Big Lake field, and how much of the pool or the surrounding country will prove productive in the deep pay can only be conjectured. The deep production trend to date is northeast-southwest by about five degrees, while that of the upper levels is northeast-southwest by about 20 degrees.

San Angelo citizens intend to wage an intensive campaign for industries, now that an ample supply of natural gas has been obtained for fuel purposes. The huge amount of cheap fuel, it is pointed out, should be an inducement for manufacturing companies to locate in San Angelo. Raw materials for a number of industries have long been in San Angelo's trade territory, chief among which can be included wool and cotton.

Manufacture of the Liquefied Petroleum Gases

THE natural gases which constitute the principal source of the liquefied petroleum gases have been used for many years as a source of gasoline. Because the richest of these gases were drawn from the top of the casings of oil wells, they were called "casing-head gases" and the gasoline separated both from them and from "dry" natural gas (unaccompanied by oil) was called "casing-head gasoline." Casing-head gasoline, more recently named and now generally called "natural" gasoline as distinguished from the gasoline made in refineries, was separated from the gas (1) by compression and cooling or by compression alone, (2) by dissolving under pressure in an oil somewhat less volatile than kerosene, from which it could subsequently be distilled, or (3) by "adsorbing" in a porous material such as "activated" charcoal, from which it was later driven by steam. In every case the higher hydrocarbons, pentane, hexane, etc., which were wanted as gasoline were accompanied by more or less of the lower hydrocarbons, propane and butane, which were not wanted because they made the gasoline too volatile. Originally the natural gasolines were allowed to "weather," that is, the dissolved propane and the other gases were allowed to escape at ordinary temperature and pressure, accompanied by a large amount of the gasoline vapor, until the gasoline was stable enough for sale. Eventually the process of submitting these escaping gases to "fractional distillation" was introduced, primarily for the purpose of recovering the gasoline they carried with them. Fractional distillation (or rectification) is the general process for separating liquids of somewhat different boiling points which occur together in solution by repeatedly evaporating and condensing portions of the mixtures. It is a process widely applied in the chemical industries; its most familiar examples are the separation of alcohol and water, and the preparation of oxygen by the fractional distillation of liquid air.

At first fractional distillation appears to have been used only to prevent the loss of gasoline during the removal of propane and butane, which were returned to the natural gas line. Later the mixture of propane and butane with some ethane and pentane, liquefied together, began to find a market; but it was not long before the advantages of a complete separation of the gases, and their marketing as separate products, became apparent. This complete separation, like the partial separation first used, is accomplished by fractional distillation. At the present time both the mixed gases and the pure substances propane, butane, and pentane, are being marketed in large quantities.

U. S. Dept. of Commerce, Bureau of Stds.

Pacific Coast Statistics for 1930

STATISTICS collected by the Pacific Coast Gas Association reveal but little recession in gas company sales and revenues in 1930 as compared with 1929. The figures include the six Pacific Slope States* and the Province of British Columbia. No exact comparison between the two years is possible as the progressive introduction of natural gas of 1150 Btu. per cubic foot heat content in Northern California Cities during the spring and summer of 1930, to replace a manufactured gas of 550 Btu. per cubic feet, caused a sharp drop in gas sales as measured in cubic feet and a parallel decrease in revenue.

The economy of the natural gas has, however, tended to open up new markets, with the result that the sales in cubic feet for the Pacific Coast for 1930 are only 2.4% under 1929. It is estimated that if it were possible to compute these sales in British thermal units, 1930 would show an increased business of about 5%. Gross revenue decreased 3.6% reflecting the tremendous rate reduction occasioned by the introduction of natural gas. Detailed figures follow:

	Year 1929	Year 1930
Production—Mcf		
Water Gas	2,976,618	3,157,715
Coal Gas	1,765,372	1,691,301
Oil Gas	32,789,295	16,252,640
Coke Oven Gas	661,394	656,926
Natural Gas Purchased	111,487,959	126,566,082
Total	149,680,638	148,324,664
Customers Dec. 31		
Domestic	1,532,146	1,561,486
Commercial & Industrial	59,671	66,747
Total	1,591,817	1,628,233
Sales—Mcf		
Domestic	62,778,855	59,898,431
Commercial & Industrial	72,554,462	72,228,423
Total	135,333,317	132,126,854
Revenue		
Domestic	$60,483,390	$58,196,703
Commercial & Industrial	17,787,758	17,284,942
Total	$78,271,148	$75,481,645
Miles of Main Dec. 31	22,338	24,018
Number of Employes Dec. 31	12,770	11,605
Payroll—Year	$20,345,181	$20,838,390

* California, Oregon, Washington, Idaho, Nevada and Arizona.

Cracking Natural Gas and Recovering Carbon Black

THE following conclusions regarding the cracking of natural gas and recovery of carbon black are abstracted from Bureau of Mines Technical Paper 483, "Reforming Natural Gas."

1. Natural gas can be cracked in a water-gas generator by making alternate air blasts and gas runs.

2. The gas produced, largely hydrogen, may be used as follows:

(*a*) Mixed in small percentage amounts with natural gas and used in place of the latter.

(*b*) Carbureted and used mixed in small percentage amounts with natural gas or used straight as manufactured gas for city distribution.

(*c*) Mixed with natural and water gas, with varying amounts of blow-run gas (varying under control), and distributed as city gas. In this manner a mixed gas can be made which can be mixed with coal gas in almost all proportions and used in common burners without making burner adjustments.

(*d*) Used as a source of hydrogen for making synthetic materials such as ammonia, or for other industrial purposes.

(*e*) Used mixed with water gas in amounts required to give a CO : H_2 ratio desired in making methanol or other products.

3. Carbon black can be recovered in making the hydrogen gas in amounts approximating 7 pounds per 1,000 cubic feet of natural gas cracked.

4. It is believed that the carbon black recovered will have a value within the range of 3 to 7 cents per pound, although such a value has not yet been established.

5. The amount of solid fuel used in the process chargeable to the cracking operation is less when some water gas is made than when only alternate air blasts and gas runs are made; this is true whether the water gas is made simultaneously with the cracked gas or in alternate straight water-gas runs.

6. A large amount of generator fuel was used in the tests in cracking natural gas by making alternate air blasts and gas runs. It is realized that with continuous operation (the tests were of short duration), improvements in operating technique, and possibly some changes in procedure the quantity of fuel required for cracking unit volume of natural gas may be materially reduced.

7. The process is worthy of further study, and if a reasonably high value can be assigned to the carbon black it should be developed.

Service Record of Employes an Index of Gas Industry's Stability

THE stability of the gas industry is nowhere better illustrated than in the service records of its employees. Many of them have known no other employer. They have grown up in the industry, have given it the best years of their lives, and in return they may be assured that the industry appreciates their loyalty and will do everything in its power to safeguard their interests.

We are all co-workers in a common cause—that of furnishing to the people of this city a constant and dependable supply of our product at the lowest price compatible with good service. To accomplish this the cooperation of every one is essential.

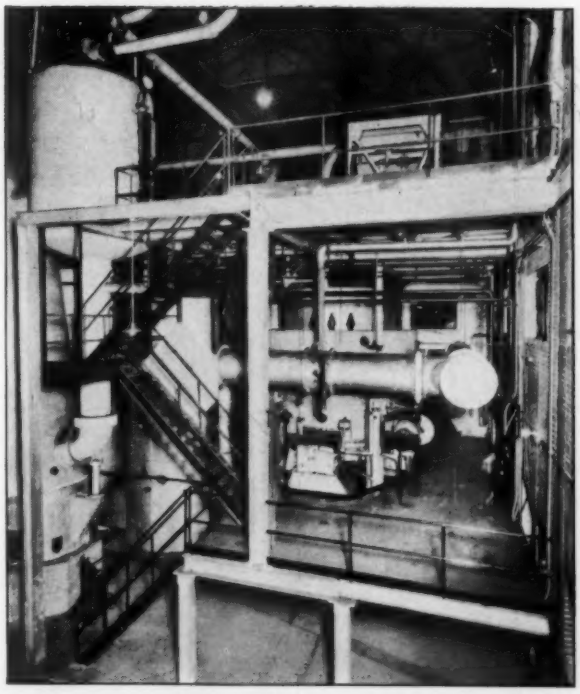
But this is only the physical side of our business. There is another side. To save life, to prevent accidents, to protect property, to promote safety, to forestall or to control emergencies—these are matters lying outside the strict mechanics of our business, but they are, nevertheless, matters of the highest and gravest importance, in which the men and women of our industry have rendered distinguished service, often at the peril of their own lives.

It is a fact worthy of repetition that such a large number of employees of long standing, not only indicates good relations between company and employee, but in its larger aspect is an assurance to the people of this city that their utility service is in safe, experienced and competent hands. Good service cannot be rendered by a shifting and impermanent body of employees. It can be rendered only by men and women who know their jobs; and one of the greatest assets that any company can have is the knowledge and ability stored up in its employees as the result of training and experience.

—George B. Cortelyou, before Quarter Century Club of Consolidated Gas Co. of New York.

U. G. I. MECHANICAL GENERATOR At Shrewsbury, Mo.

For St. Louis County Gas Company



This is the 26th U. G. I. Mechanical Generator *to be placed in operation*

Advantages of the U. G. I. Mechanical Generator:

Continuous operation for extended periods
Low fuel consumption
Low labor costs
Low carbon loss in ash
Low maintenance
Heat otherwise lost recovered as steam
Bituminous coal may be used as fuel

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS

INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

Philadelphia
112 North Broad Street

Chicago
Conway Building

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street **Cleveland. Ohio**

NEW FEATURES

simplify the accurate use of wet test meters

AMERICAN Meter Company's Standard Laboratory Wet Test Meters are now equipped with a new type of gauge glass and water line marker. With these improvements the water line can be set more quickly and with greater assurance of accuracy.

New Gauge Glass

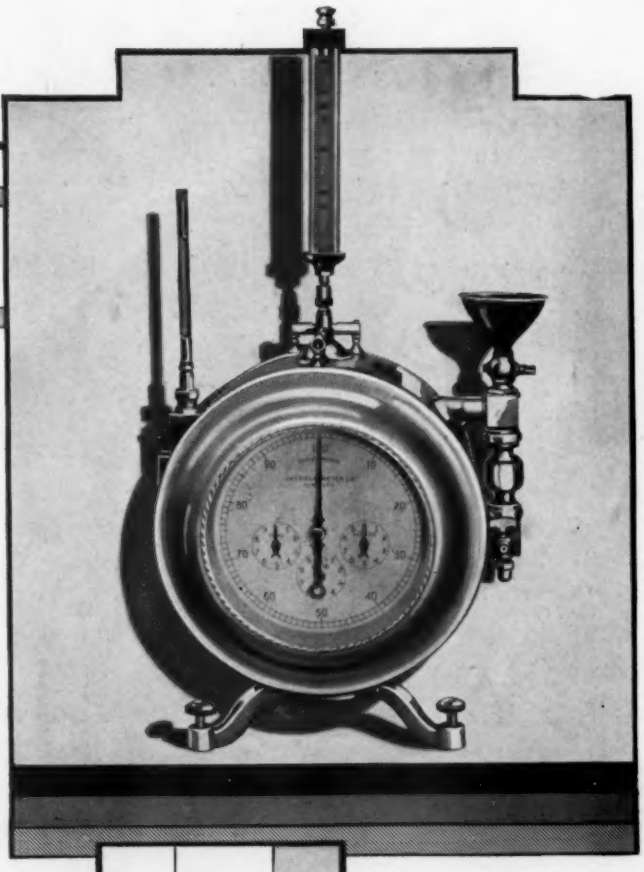
As shown in the illustration, the glass is shaped to reduce capillary attraction by providing a large cross-sectional area at the point in the water column where the meniscus forms.

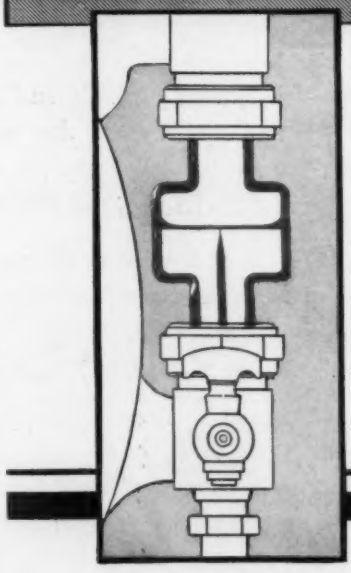
New Chromium Plated Water Line Pointer

For setting the water line a chromium-plated pointer is located centrally within the gauge glass and screwed into a bottom support. This replaces the two markers formerly used on the outside of the glass.

The threaded base of the water line pointer extends through the lower support to allow an easy adjustment, after which it is firmly held in place by a lock nut and sealing cap. Chromium plating of the pointer insures visibility and eliminates corrosion or discoloration.

D. McDonald and Company, Manufacturing Headquarters for American Meter Company Apparatus, Albany, N. Y.





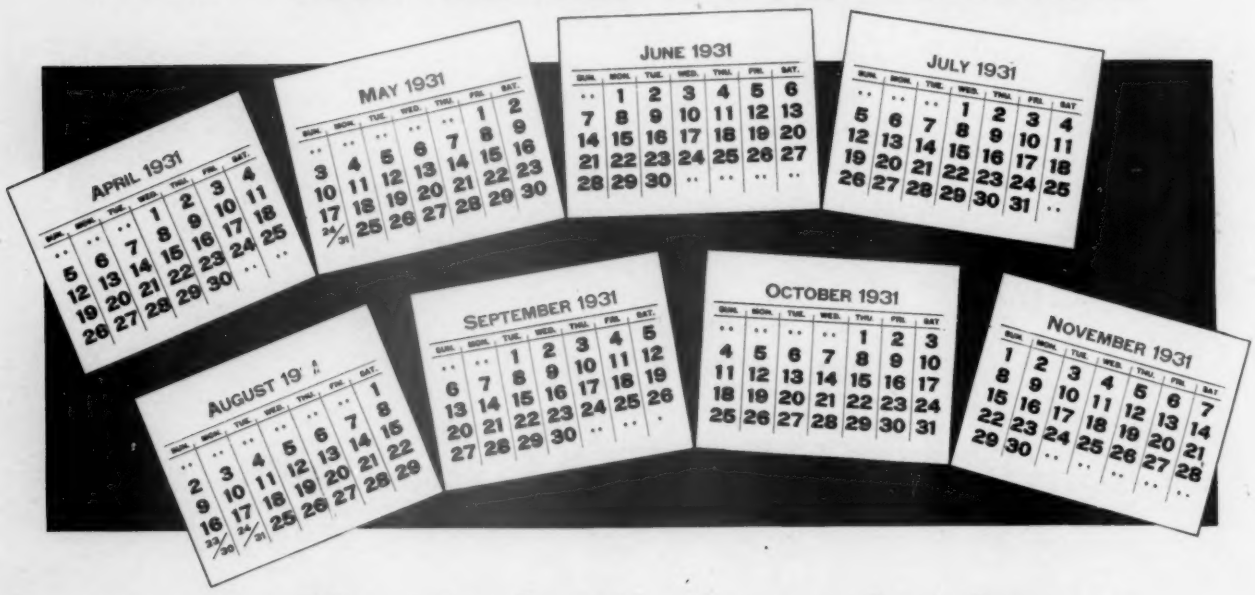
These two improvements are typical of the progress in design constantly being made by American Meter Company. Write us for full information concerning Wet Test Meters, improved Protector Pressure Gauges, or other apparatus.

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
Established 1836

GENERAL OFFICES : 105 W.40TH STREET · NEW YORK, N.Y.

SALES · ALBANY · BALTIMORE · BIRMINGHAM · BOSTON · CHICAGO · DALLAS · DENVER · ERIE
SERVICE · HOUSTON · KANSAS CITY · LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA

An Eight Month Season
For Gas Main Construction



.... *Now is the time to make plans*

IN the northern states gas main and pipe line work can be done most economically and quickly in the eight months season from April to November.

PRELIMINARY ENGINEERING

We will assist in the design of lines, choice of materials, selection of best rights-of-way from the standpoint of construction costs, preparation of estimates, etc.

CONSTRUCTION

Our organization, experienced in gas main construction, with adequate, modern labor-saving equipment, operates on a basis of low cost with all savings reverting to the client.

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS

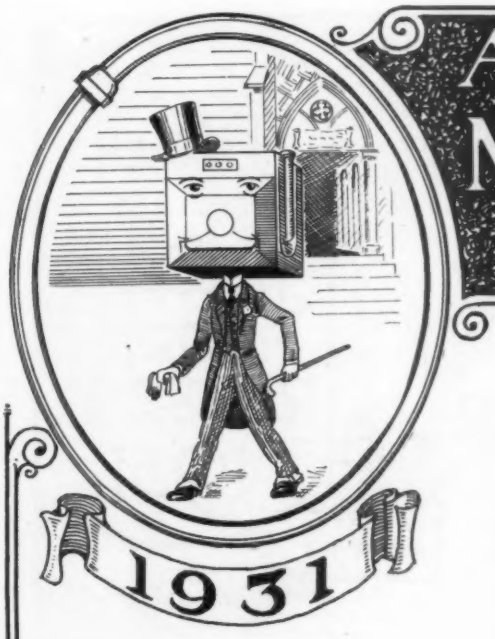
INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

Philadelphia
112 North Broad Street

Chicago
Conway Building

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED



AMERICAN GAS MERCHANDISING ALMANACK

April

The month of the Diamond. A shining month for the man who has things to sell to the Home Manager. Flower,—the Daisy.

GENERALLY speaking, April ushers in the real spring season "April showers bring May flowers" and opportunities for the gas man. Gas ranges, incinerators, laundry dryers, gas water heaters and refrigerators all come in for a goodly share of attention by the Home Manager. It is at this season that she truly realizes that it is time to put her home in order, dispose of the old worn out gas range and install one modeled along modern lines with time and temperature control; time to give up the idea of trying to do another season with an antiquated ice box and to purchase a silent, economical gas refrigerator.

Rainy wash days recall to her mind the advertisements that the gas company has been running on gas laundry dryers "with drying space equivalent to sixty feet of out door line" and ever clean. She remembers that the furnace is "down" and that the running up and down stairs to light a tank heater is a bloomin' bother and a row provoker every time the head of the house has to shave.

April finds the home manager receptive to the purchase of the many gas appliances that will save her time and temper, despite the fact that she expects to purchase some new Easter togs. The gas man who is looking for new business, will find April an ideal month to make a flying start.

Start out April the first and fool yourself by asking more people to buy. New appliances, low prices and additional advertising have paved the way as never before for the salesman who will expose himself to sales.

1—Wed.	**Gas Range Sales Opens. Turn over all prospects to salesmen.**
2—Thurs.	**Put in special Easter Window Display advertisement. Have Home Service Department demonstrate special Lenten dishes.**
3—Fri.	Good Friday. **Invite folks to visit the store where Hot Cross Buns will be served by the Home Service Department.**
4—Sat.	**Use 'phone to notify selected list of live prospects about your special sale of gas ranges. Ask them to visit the store and examine the new models.**
5—Sun.	Easter Sunday. Elihu Yale born, 1649. No Sunday dinners were cooked by time and temperature in his time.
6—Mon.	**Good day to talk about laundry dryers when visiting the homes of gas range prospects.**
7—Tues.	2,009,031 slaves in U. S., 1859. They are all free today along with millions of home managers who use gas, the carefree fuel.
8—Wed.	**Have whole meal cooking demonstration in the store. Distribute special gas range literature.**
9—Thurs.	Lee surrendered at Appomattox, 1865. At this time Baltimore citizens were paying $3.00 per M. cu. ft. for gas with an additional Government tax of 25c.
10—Fri.	New York Tribune first issued 1841.
11—Sat.	**Check-over window display, prospect lists, store display, stock.**
12—Sun.	Henry Clay born, 1777.
13—Mon.	**Again go over all sales details. Make-up advertisement for newspapers.**
14—Tues.	**Run sizable newspaper advertisement.**
15—Wed.	**Change window displays; rearrange floor displays.**
16—Thurs.	**Hold ten minute meeting with salesmen in morning. Check list of prospects to be invited to store demonstration.**
17—Fri.	**Run newspaper advertisement.**
18—Sat.	**Lay out plan for wind-up sale, and arrange for final advertising to conclude sale. See that a fresh supply of advertising is at hand for store distribution.**
19—Sun.	Battle of Lexington, 1775.
20—Mon.	**Morning meeting of fifteen minutes with salesmen. Talk with store sales people, check over floor and window displays, get home service plan for demonstration. Make up newspaper advertisement.**
21—Tues.	**Conduct store demonstration, gas range in combination with silent gas refrigerator. Tell of the advantages of Hot Water Service in the home, of gas laundry equipment and the incinerator.**
22—Wed.	War with Spain declared, 1898.
23—Thurs.	**Run newspaper advertisement.**
24—Fri.	**Check stocks, have store displays cleaned, windows washed, put on clean price tags. Use telephone to bring in or interest prospects.**
25—Sat.	**Final check-up to see that all is in readiness for final drive to go over the quota set for special sale.**
26—Sun.	Lafayette sailed from France as a volunteer in American Revolutionary army, 1777.
27—Mon.	**Have final meeting of sales force, check-up on results of sale to date. Make up final "last call newspaper advertisement," make special effort to close all live prospects.**
28—Tues.	**Run final newspaper advertisement. Follow-up every lead closely, attend to all "pending business" in connection with sale.**
29—Wed.	**Leave water heater literature with all home managers visited. Have final store demonstration.**
30—Thurs.	London Gas Light company chartered, 1812. **Sale ends.**

Fill Up The Holders

Some Suggestions on Range Sale Planning

WITH the wonderful array of new gas ranges that the gas man has to choose from this spring and the reams and reams of paper that have gone into sales helps, with an ever receptive market for new and first class cooking appliances, we approach this subject with the idea of presenting some old ideas in a new dress and some new ideas on the subject that may prove of some benefit to all the gas men.

Before setting down the suggestions offered in this article we went to some pains to check many plans that did and did not do a real job of selling. We took into consideration plans that, in a so-called year of depression,—one nearly comparable with the year 1931,—saw gas range sales made to 28% of a certain company's meters in 30 days; one that through a very limited newspaper advertising campaign and window display introduced a new make of gas range in thirty days while others, under what seemed to be the most favorable conditions, hardly paid for the expense.

The day is past when that gas man or any other specialty dealer can simply *put on a sale* and make any worthwhile showing. Due to the various competitive forces that exist today, any item that is to be sold in worth while numbers must be sold by plan.

In building a plan the following factors must be considered:

1—Name or theme song of the activity.
2—Dates of activity. When to open the drive and when to close it.
3—The merchandise. Will the drive aim to sell a single item or a complete line?
4—Prices and terms.

A door-knob hanger in the form of a die cut key printed in red and black, a jumbo telegram announcing a new model or line of gas ranges, and a teaser advertisement. Aside from this large newspaper mats and other display material and literature were supplied

A suggestion for a cover for your sales plan. Experts in sales promotion agree that plans should be encased and bound securely in an attractive cover.

5—Trade-in allowances, premiums or other concessions.
6—Method of exploiting the activity: Newspaper Advertising, Bill Inserts, Door-knob Hangers, Broadsides, Inserts, Truck Banners, Street Car Cards, Novelties, Bulletin Boards, Store Display, Window Display Showmanship, Demonstrations.
7—The market, which considered carefully will enable you to work out a reasonable, fair quota.
8—Employee Co-operation, commissions for leads, etc.

These items laid out and considered, the next thing is to build a working schedule. This schedule should be laid out to show the steps to be taken at each stage of the campaign with space for notes on action or results, thus:

March 23 Check with Billing Department; see that inserts go out with Bills.
Action: Inserts delivered by printer to Billing Department.
March 24 Check with manufacturer on advertising material, stock and special window display material.
Action
March 25 Secure copy of letter from Manager to be sent to employees.
Action

—and so for everything that has to be taken care of during and before the activity gets under way.

Building the Plan

In that it is the desire of the gas man not only to retain the cooking load but to see it grow, we have taken as the Theme Song for our activity: "FILL UP The

The new
gas ranges have
BEAUTY
and Brains
The new cooking appliances at your Gas Company office certainly have "It"!... Here is the most radical change in "kitchen mechanics" since the invention of the can opener. It is an answer to thousands of women who have demanded these modern conveniences; they have written their own specifications.
HERE ARE SOME OF THEM:
"YOUR GAS COMPANY SERVES WHEREVER IT SELLS"
CONSOLIDATED GAS COMPANY OF NEW YORK
4 Irving Place, New York City
Consolidated Gas Company of New York
4 IRVING PLACE NEW YORK CITY
Telephone STUyvesant 4900

Here's the way a metropolitan gas company, the Consolidated Gas Company, New York introduced a new line of ranges and range features to the public

Holders." The cooking load is the one big way to do it for in good times and bad, folks *will* cook.

Our next move is to decide upon the duration of the activity. We have in this case decided upon an intensive activity of thirty days. The drive to open with a morning meeting on Wednesday, April 1 and to close at the close of business on Thursday, April 30.

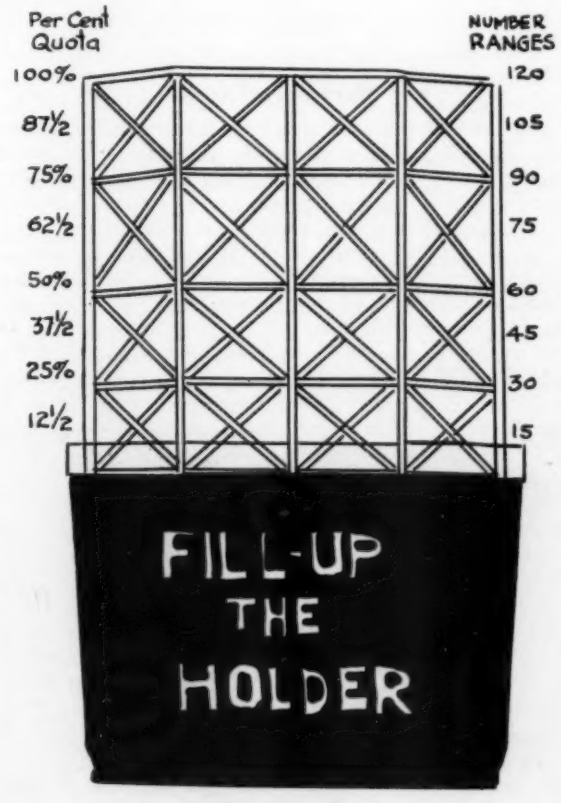
The Merchandise, for purpose of illustration, to be featured is a line of three ranges; a low price popular model, a middle price and a medium-high-priced range. All ranges to be of a modern type having in all cases an oven heat regulator. All non-regulated ranges to be taken off the floor during this period. Low priced and custom-built ranges to be sold from store-room or catalog. Remember, our drive is to attain a definite objective or quota in a short intensive drive—and too many models slow up sales.

Prices and terms: Prices may be built to include special allowances, trade-ins, bonuses, premiums and employee commissions. In any case the resale price (cash) should be built up from the invoice cost of the appliance and should include a net profit of at least 10%. Terms may be spread over 12, 15 or in extreme cases, 18 months. Term prices should be from 7% to 10% above the cash price, depending upon the number of months payments are to be spread over. The down payment, in case of twelve months, should be 1/13th down and the balance in twelve equal monthly payments; where the payments are spread over a longer period, at least 1/12th should constitute the first payment, with the balance divisible by the number of months to run. Where allowances are given for old stoves, the maximum amount of this allowance should be $10.00. Where premiums are given, the down payment should cover some amount over and above the cost of the premiums.

Bonuses: In conducting a drive of this kind it has been found that a special bonus to regular, out-side salesmen is well worth all it costs. It is our suggestion that $1.00 in the form of a bonus be paid for each order approved by the credit department during this sale; this bonus to be in addition to regular compensation and aside from any prize money that the salesman may be eligible to.

The method of exploiting a sales activity of this kind is very important and due consideration should be exercised in planning and carrying it out. In our plan we will illustrate as though we were going to employ most all of the accepted methods. The gas man who wishes to model a plan along the lines we outline may use the kinds and types of advertising that he feels will best suit his particular needs.

First, we are going to consider newspaper advertising and with the quota that we have set for this activity, we



Sales Progress Chart

will assume that we will use eight (8) one-half pages of newspaper advertising or in all, 4800 lines. These advertisements first will introduce our special activity, picture the merchandise, show prices, terms, premiums or state allowances for old equipment to be made, and

play-up the desirability of possessing a modern gas range equipped with all the new gadgets, insulated, or what have you, and tell the Home Manager what such a possession will mean to her in terms of time, temper, freedom from pot-watching, better cooked foods and what an impression, if you will, it will make when visitors journey to the kitchen. The following advertisements would then in turn play-up each of these appeals in plain talks to the home manager: Beauty, color, design, up-to-dateness in one; freedom from cooking worries, hot kitchens, spoiled or burnt foods, better foods in another; and price and terms, trade-in, or premiums, etc. etc., in the others—always what you get, what it will do for you. In building copy for inserts the same appeals would be used in tabloid form. Door-knob hangers would feature terms, low down payment, or long time to pay, or "Free Premiums;" broadsides would follow in the lead of the newspaper advertisements save that more details of color, design, construction, etc., would be embodied in the copy; truck banners, street car cards, novelties, bulletin boards would all be designed to flash a quick message as to low down payment, trade in or premium offer.

The store display would be a display of all the feature models in action, connected and adjusted to do their stuff.

The window or windows would contain displays tuned into the modern trend; displays that put over an idea related to the gas range or the home manager and cooking.

Showmanship would be worked into all of these things and in connection with any demonstrations that might be conducted.

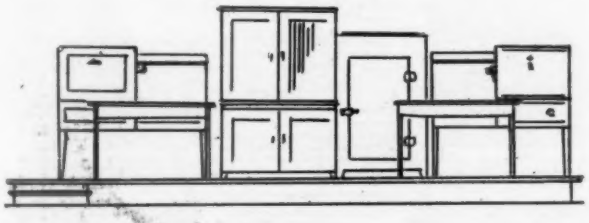
The Market and Quota

From information that we have been able to secure, there is a wide variance as to how to figure a market or compute a quota that will fit into even the so-called average situation, so we are using a hypothetical population, number of domestic meters and taking as a case for purpose of illustration a city where 3000 homes use gas for cooking (3000 domestic meters). Then we have assumed that the sale of gas ranges per year, in average times, in a city of this size, will be at least equal to 10% of the meters in use—8% replacement business and 2% new business, or a range business of 300 gas ranges per year for the city. With these figures we then set about to decide on a quota to be attained in a thirty days intensive drive. We consider the fact that we are going to offer a new product, a low price, special terms, a premium, or a trade-in; that we are going to pay all employees a commission for leads and that we are going to pay our salesmen an extra bonus for sales closed during the thirty day period—and we are going to exploit the sale and the merchandise for all it is worth. With these facts in mind we say we WILL sell 40% of the average yearly quota of the city in thirty days. We set a quota of 120 ranges which is not a big order as gas men do things today.

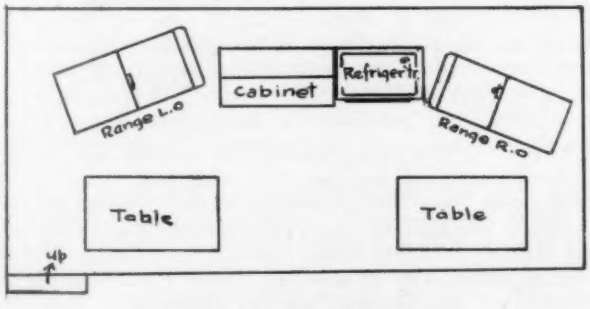
Another Way

Another method,—which amounts to approximately the same as that laid out above for arriving at a quota to shoot at and for building a budget would be as follows: Assume that the city has a population of 100,000 and that you have 25,000 domestic meters. On the above basis, you would have a total yearly sale in your city of 2,500 gas ranges, 80% of which it is reasonable to assume would be sold from your store, (gas company) which would be 2,000 gas ranges during the year. Now, if you held an intensive drive for thirty days and employed the tools outlined above, it is only reasonable to assume that you would sell at least 40% of this 2,000 gas ranges in thirty days. To set up a budget for such a drive, we will assume that the average cash price of the ranges is $120.00. Your total cash sales during this thirty day period would amount to $96,000. From this amount you would then build up your budget somewhat in this fashion:

Newspaper advertising,—lines @	$——— per line
Door Knob Hangers; free, furnished by manufacturer, distribution—@ per—1000	———
Inserting folders, clerical help	———
Special Store and Window Cards 10 @ 1.25	12.50
Photos, Banners, Misc. Supplies	———
Bonuses 800 ranges @ $1.00	800.00
Prizes $ For High Salesman No. Ranges	———
Prizes $ For High Salesman $ Value	———
Prizes $ High Employee sales to prospects of	———
Prizes $ For High Employee S Value of prospects	———
Other expenses, demonstration, etc.	———
Total.	———



Elevation



PLAN OF STAGE

Plan for laying out the work shop for the demonstrator. This idea comes to us from one of the most sought for demonstrators in the country. Note how simple this lay-out is yet how convenient; that there is both a right and left hand oven range on the platform as well as a silent gas refrigerator.

The total may be worked out on a percentage of dollar value of merchandise sold or on a basis of cents per total number of meters in use. We are not going to submit any figure in this connection, but will simply offer a suggested method that may be employed. It is always advisable to bear in mind and make clear to salesmen and employees, when prizes are offered, that the amount of the prizes scales up or down in relation to the number of ranges sold.

Employee co-operation is always desirable and in drives of this type it will be found profitable to offer all employees a fixed commission for prospects turned in that are sold during the special drive. The Merchandise or General Manager of the company should call the employees together to announce such plans as well as write each of them a letter asking for their support.

A Sales Progress Chart, to keep up interest may be made along the lines shown in the sketch accompanying this article. Cut out holder tank and guide frames as shown from composition board; cut out a "lift" and set back of the guide frame cut-out; as sales are made raise "lift" to indicate progress. Show number of ranges sold and percentages of quota reached along the side of the guide frame. Paint "lift" red as well as tank and guide frame, or if you wish to be progressive, paint aluminum. Letter tank with theme song of your sale.

Some other ideas that have been used successfully in connection with gas range sales are:

Auction Plans—one or more ranges auctioned during the drive.

Old Stove Contest—special trade for oldest stove.

Most Words Contest—range for the greatest number of words from range name.

Club Contest—price for every prospect turned in by club when range is sold; amount to apply to purchase of range.

Premiums have been offered in the form of glass and aluminum cooking set, range timer and cook's clock combined, cutlery sets, kitchen exhaust fans, electric kitchen clocks, combination step-ladder-stool and any number of others.

Why Laundry Dryers Don't Move

W. P. McCOY
Sales Manager, Judelson Dryer Corp.

A LOT of publicity is needed to sell the IDEA of gas heated laundry dryers to the general public—particularly those who live in private dwellings—and the gas industry as such ought to bear the burden of this selling effort. The manufacturer's profit ceases when he sells the appliance, whereas the gas company has a profit on the sale of the appliance and a continuing profit even after its installation. With the burden of selling the IDEA of clothes dryers off his shoulders the manufacturer can use whatever funds he has for promotional purposes to sell the product itself.

The cost of selling dryers to the gas companies is almost prohibitive, yet a very profitable business can be done selling direct to the user. For example, it is probable that one hundred dryers can be sold direct to users at a goodly profit in less time than it takes to sell one dryer to a gas company at a loss.

As chairman of the 1930 Committee on Laundry Equipment, the writer's survey showed that, of all the gas companies in the United States, only 63 displayed a driyer at "some time" during the past three years.

Obviously, every gas company in the United States should have a clothes dryer display *on all* of its sales floors. National publicity on dryers will be wasted until there is a dryer on the sales floor of *every* gas company. To cash in on national publicity and national dryer propaganda there must be a place in *every town* where the public can actually see the device—and that place should be the local gas office.

One would think that the gas industry is healthy enough financially to invest seventy-five to one hundred dollars in a dryer to display on each of their sales floors —yet, the fact remains that only about sixty companies out of the total in this country have declared themselves as having displayed a clothes dryer "some time" during the past three years.

From the writer's personal observation, the condition of many of the dryers on display was not such as to create a desire for them on the part of any one seeing them. There are exceptions, of course, but many of the dryers inspected on gas company sales floors were used as a "hide all" for junk and rubbish—overshoes, umbrellas, coats, bottles of furniture polish, dust cloths, mops, discarded circulars and old newspapers. And then these self same New Business Managers tell us that they can't sell dryers.

Many gas companies made the mistake of starting out to sell dryers at the bottom of the list, when they should have started at the top of the list where price is not an important factor, but where safe, efficient and entirely satisfactory performance is the dominating consideration.

There are years of work ahead among just the upper strata alone before exhausting the possibilities of that part of the potential dryer field. With dryers, the slogan should be, "Sell the Van Stuyvesants first—and you will surey sell the Sweeney's later."

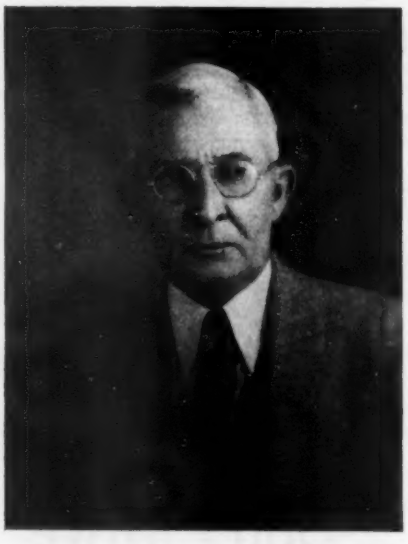
There seems to be a tendency to make a complicated proposition out of selling clothes dryers. Selling dryers is so simple that its simplicity has proved deceiving. *Real activity is what is needed.* All that is really necessary is to properly display dryers of various types and sizes and then keep everlastingly after potential prospects. Any gas company salesman could hardly be

The Laundry Dryer Makes for Customer Happiness

excused from selling one dryer per month if he *actually* put forth the effort. He will say he *does* put forth the effort but we know he doesn't. There isn't a gas company in the country that has averaged one dryer per salesman per month per year; believe it or not. Thousands of dryers will be sold just as soon as the executives of gas companies realize the value of the dryer load and issue peremptory orders that every salesman in the employ of the company shall find at least one place each month to sell a dryer—and make bonuses on other appliances conditional upon the sale of one dryer per month. Not asking much, is it? But if every gas company will start out with a quota of one dryer per month per man, it will not be long before the salesmen themselves will be setting and obtaining quotas that would be unbelievable today.

Here's How

Some trump cards played by William Groos, of Texas Public Service Company, Austin, in Selling Gas Ranges



AS a background for my work of selling I had a year's experience in charge of the complaint and order desk; and following that, a month on the truck with the complaint man adjusting gas appliances, and looking after leaks and other minor ills real and fancied. When the opportunity was given me to become a unit in the Sales Department of the Company I found this technical knowledge of great value: in other words, I knew my merchandise from its weakest points to its strongest and was thoroughly sold on the line. This, in my opinion, is the salesman's greatest asset; for if he is not sold on the merchandise he is offering he will certainly have great difficulty in selling any one else.

I was given a certain territory in the City of Austin in which there were about 1500 customers, as shown by the meter readers' route books. From these lists I made up a card on every house in the district, and then started in on a house to house canvass not only of our consumers, but those in my territory not on our lines. I made about twenty calls a day, preferably in the morning when the lady of the house was most likely to be at home. Having her name on my card, I would introduce myself to her, telling her I was a salesman for the Gas Company and would like to know just what gas appliances she was using and if they were giving satisfaction. Upon being told, as was the case in a great many instances, that the range smoked or some little thing was wrong, I asked to be allowed to see what could be done to remedy the complaint, and was usually able to make some minor adjustment, showing her that I understood something about the goods I was selling. This would give me an opportunity to see what she needed and talk appliances to her; and also an assurance of welcome when I called again. The date of my call and all other information that I thought important was noted on my card to be filed for future reference. Some would not be interested at the time, but would be when a special sale was to be put on. These were listed in a memorandum book, and when a special was advertised I had a list of live prospects to start on. I made a personal call at the first opportunity. I used phone calls only when it was impossible to make a personal one, as it was my experience that one personal visit was worth many phone calls in the effort to get the prospective customer to visit our sales floor and inspect the ranges and other appliances advertised. This usually resulted in a sale then or soon afterward.

A record of all sales of real estate in my territory was kept with the new owners name, Street and Lot number. I also kept a record of all building permits with names of contractors who in turn furnished me the names of the prospective occupants. These were in due course of time visited and a purchase of gas appliances for the new home solicited. I also advised with them as to the type of appliances needed and their proper installation. I would keep in touch with the building as it progressed so as to know just when gas service would be needed, and at that time would arrange for the signing of service application and a meter installation order so there would be no delay when occupants were ready to move in. By this time I had a personal acquaintance with the family, knowing their needs and their purchase power; therefore, in most cases, closing the contract was a mere formality.

A record was also obtained from the Public Health Department each week of all births in my territory. This was along water heater sales activity, but sometimes a range sale was made, and in any event a friendly relation was established which formed a foundation for future sales. This appears, perhaps, to be looking far ahead, but I have found that it paid.

When a range, or a major appliance, was sold and

installed I made it my business to call within twenty-four hours to see that it was properly adjusted, explaining the proper care and use of the appliance. I find that this personal attention goes far in creating a friendly feeling and shows that we are not only interested in selling, but interested in seeing that the appliance is giving the utmost service. I find that these calls on the jobs I have sold did much to secure good will and the confidence of the customers and resulted in future sales to them and recommendation to their friends and neighbors.

Allow me to say in closing that I attribute a large part of my success to the help and co-operation of a very live Commercial Manager who knows the best merchandise to handle, and is always ready to get what is wanted and needed on short notice.

Robert F. Crowell, Bridgeton, N. J., Gas Light Company, gives a few tips on selling Gas Water Heaters

MY Boss is Jake Jones, and as we are a comparatively small company, we know everybody in town. I guess he knows pretty much everybody, and everywhere, for whenever there is a reception to be held to entertain some person of political prominence, it is held at his home, and when the Circus comes to town, it is a holiday. If the holders are full in the morning, that is the last we see of him, until they pull out of town.

I am not telling stories on my Boss, but just giving you a sidelight on our Water Heater business. He believes that the greatest outlet for new business in a company of our size, is from the Gas Hot Water Heater, which makes my job easy to start with.

Now, so much for the prologue, and getting down to Sales.

We carry a complete line of Water Heaters, and are equipped to make, not only prompt, but almost instant installation. In addition, we carry a supply of repair parts, to take care of any emergency.

Just because we have been loyal to our friends, we have been able to give service to our consumers. I mention this, because on a Sunday morning, when a coil in one of our large heaters went bad, we sent a truck to Philadelphia, and at the same time, the representative of the firm with whom we do business, left his home, furnished us with a new coil, and everybody was happy.

The idea I want to get over is, that if your Boss is sold, and has a good company back of him, any salesman who is sincere and conscientious, can sell Water Heaters.

We dig up prospects, just in the human course of travel. None of the boys in the office go to the same barber shop, nor do the girls go to the same beauty shop, but if there is a lack of hot water, they are a prospect.

The same thing applies to restaurants. We never eat at the same place, and it may be interesting to know that we have either a Storage Type or Automatic Heater in *every* barber shop and restaurant in our city.

When it comes to the home, our problem is somewhat more difficult, but the pleasure and satisfaction of hot water in which to bathe and shave, in a degree, overcomes the objection of the Mrs. who is working under a budget plan.

I cannot tell anybody else how to sell Hot Water Heaters, but it seems to me to be just a matter of applied common sense.

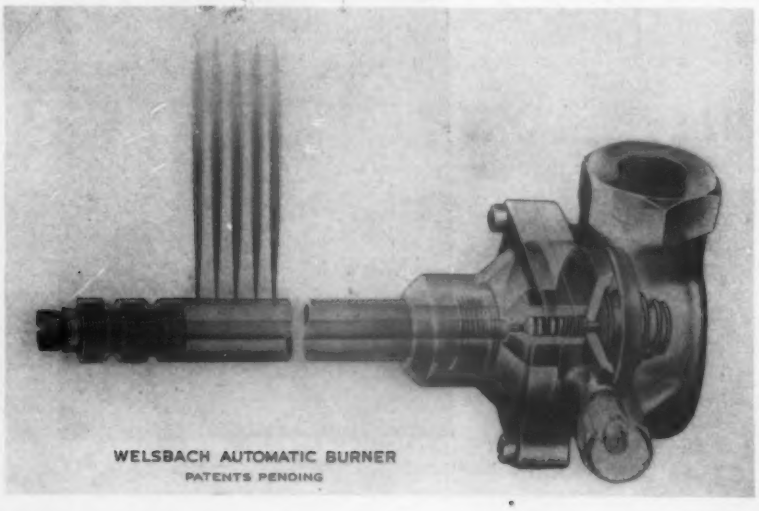
To be sure, we use newspaper space; in fact, we are very liberal on that side, and the Water Heater people are very generous with their folders, which are sent out carefully.

Selling Water Heaters just seems to be a matter of sizing up your possibilities, and then trying to make the most of them.

EQUIPMENT NEWS

Welsbach Automatic Burner

The Welsbach Company, Gloucester, N. J. announce a new water heater automatic burner. The accompanying illustration shows the burner in details. They state that in this new burner there are no air ports to clog—a smokeless yellow flame, absolutely silent in operation and can be turned so low that it is hardly visible. Besides this it combines in a single unit, the functions of both main burner and complete 100% safety shut-off with the use of only one combustion system.



If the burner flame is extinguished it shuts off all the gas to the heater and does it so promptly that the amount of unburned escaped gas is negligible.

The amount of gas consumed is not affected by the pressure because it has a compensating action which only permits a relatively constant flow of gas to the burner regardless of its pressure, within reasonable limits.

All of this is accomplished without the use of delicate knife edges, multiplying levers, latches and other complicated mechanisms.

The compensating action of the burner is described as follows: Should the gas pressure become greater than normal the flames have a tendency to leave the burner tube, under this condition the tube becomes cooler which in turn slightly closes the main valve. Conversely, should the pressure decrease, the flames would tend to hug the tube, heating it slightly above its normal temperature, and this would cause the valve to open further and allow more gas to pass. Due to this action, the amount of gas which flows is practically constant.

Descriptive booklet mailed on request.

An Easily Installed Low Priced Temperature Control

The Partlow Corporation, New Hartford, N. Y. manufacturers of Temperature Controls, Contactors, Gas-Burning Equipment, Safety Gas Valves and Pilots, announce a new temperature control with ease of installation as its outstanding feature.

This new control was designed especially to meet the needs of manufacturers of appliances of small gas consumption, who, heretofore have been prevented from equipping their appliances with temperature controls on account of the cost of controls and expense of attaching. With this new Partlow Temperature Control such manufacturers will find that it is unnecessary to re-design their appliance in order to make the temperature control installation; and that there is practically no attaching expense. They will also find the initial cost of controls very low in price, due to quantity production.

The ease of installing this new temperature control is made possible by the use of a patented flexible capillary tubing with a mercury bulb attached to one end. No matter how restricted the space, the mercury bulb is quickly and easily installed in the pot, vat or oven and the control body placed in the most accessible position for easy setting and reading.

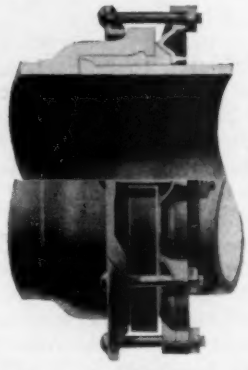
Simplicity of control construction is also an added feature. Neglect, rough usage and exposure no longer affect this control. The control is so designed that the instrument is entirely free from intricate or delicate mechanism. Thus it is rugged, "fool-proof" and when once set will require no further attention. Each one is equipped with an indicating dial which allows one to set the control at any predetermined degree of temperature desired ....or for varying temperatures when the same appliance is used for several kinds of work. This indicating dial can also be especially calibrated for any desired temperature for specific application, when quantity will permit and definite gas consumption is known.

New Partlow Temperature Control

Full details regarding this new Temperature Control as manufactured by the Partlow Corporation, will be mailed upon request.

New Dresser Repair Clamp

The S. R. Dresser Manufacturing Co., Bradford, Pa., have recently announced a new bell and spigot Repair Clamp known as Style 4½ H.P.



In this clamp a gasket of reverse wedge-shape overlaps the caulking and insures a perfect seal whether the joint is straight or extremely out of alignment. The clamp ring confines the gasket and regulates its compression.

The manufacturer claims that sufficient flexibility is provided by the resiliency of the gasket to permit considerable movement without impairment of the utility of the clamp. The clamp is simple in design, light in weight but has adequate strength at all points of stress. A descriptive folder is available from the manufacturer.

New Gas Fired Hot Water Room Heater

The Emans Manufacturing Co., Willmar, Minn., announce a new portable hot water room heater. The entire unit is

built on a copper heating base, known as the hot water chamber, and is constructed of metal. This chamber is shallow and has a large diameter, which gives rapid heating advantage and a sturdy base. There are heating flues which pass from the bottom of the hot water chamber through the center and out the sides, for the purpose of allowing the heated air to pass through, thus heating the water more rapidly.

A hot water feed pipe is so placed that it allows the heated water to pass from the hot water chamber to the hot water reserve tank. This reserve tank opens into the core of the radiator and allows the heated water to flow through the core.

The hot water feed pipe connects the top of the heating chamber to the lower part of the upper tank. A large supply of water lies above the hot water feed pipe.

Therefore, the unit can operate for a long time before it is necessary to add additional water.

In operation: heat is applied to the hot water chamber. When the water contained therein becomes heated, it passes up the hot water feed pipe into the hot water reserve tank. From this tank it flows into the radiator core. In passing through the core, the air currents which are propelled by the fan are heated and circulate about the room. This process of heating the air cools the water. When the water becomes cool, it returns to the hot water chamber through the cold water return pipe. The hot water feed pipe is at the rear of the chamber, and the cold water return pipe is at the front of the chamber. Therefore, before it can rise again, the water must pass across the entire heating chamber.

The unit is so compact that it can be entirely placed upon a single gas burner.

This hot water heater requires no boilers. No installation or expense thereof.

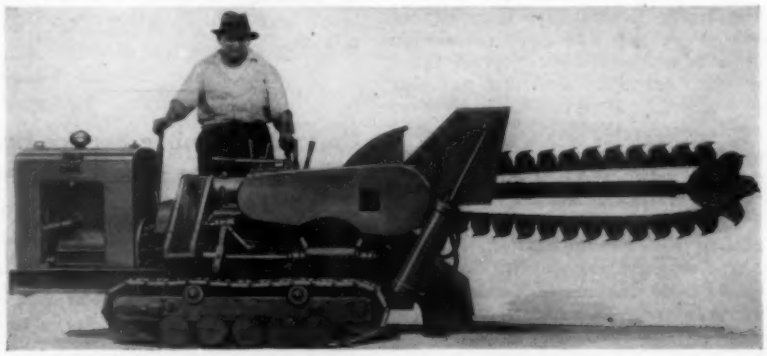
It is portable, and can be carried from one place to another.

Descriptive catalog will be mailed on request.

Ditcher for Small Ditching Work

The National Equipment Corporation, Milwaukee, Wisconsin have issued a bulletin describing a small ditcher for laying small pipe.

It is designed to dig a trench from 3" to 6" wide, for digging gas service connections, high pressure gas lines, small oil pipe lines, ornamental lighting cables, telephone cables, sprinkling and drain pipes in golf grounds and airports, and in any other underground work that requires a trench up to 6" in width and 48" in depth.



Digging speeds vary from one to six feet per minute. Two speeds are available without changing sprockets and 36 speeds may be had by changing sprockets. Full multiplane traction with very low ground pressure permits operation on wet soil without miring and on lawns and parkways without injury to the grass.

Operating levers have been centralized on one side of the Goldigger for convenience of the operator in keeping his machine digging to the best advantage at all times. It can be used in very small spaces and its narrow width will allow it to pass buildings, trees, electric light and telephone poles, where the clearances are small.

An eight-page illustrated folder with details and specifications will be sent upon request.

New Gas Filter

A gas filter to keep pilot lines free has been put on the market by the Hugo Manufacturing Co., of Duluth, Minnesota. The filter is attached ahead of adjustments and removes all scale or other foreign matter. It is made of special tubing with brass connections. The filtering element is a heavy filter paper folded to permit the pasage of 60 feet of gas per hour. It is only six and a half inches long and, according to the manufacturer, very easily installed.

It has been tested in one city where 9,000 installations were made. Reports, it is stated, showed a decrease of from 2,400 service calls a year, due to adjustments and dirty burners, to only 300—a decrease of 87½%.

A weak pilot light that is easily whiffed out is generaly due to clogged orifice or adjustments. The new filter, it is claimed, is a guard that keeps the gas flowing at full strength.

The trade name of the filter is HAWKS, a name which many of the other products manufactured by Hugo Manufacturing Co. have made well known to the gas appliance industry.

Brooklyn Union Opens New Branch Office

The new Ridgewood Office of the Brooklyn Union Gas Co. was opened to the public recently.

In keeping with the other new branch offices of the company the Ridgewood Office has been equipped with modern interior furnishings, a new turret counter and furniture of early American period. The latest semi-indirect lighting and the latest window lighting systems have been adopted.

Entering the office a customer sees an attractive display of the modern domestic gas appliances, such as ranges, water heaters and refrigerators. The customer can inspect this display as he or she enters or leaves the office on a visit to pay a bill at the turret counter in the rear of the store or to obtain some service from the contact men whose desks are located at the side of the sales floor.

As in the other modern offices the desk of the man in charge of the branch, E. L. Shultz, is located in the open, easily seen by the customer. The appliance sales staff will be under the direction of E. W. McLaughlin.

Favors Municipal Ownership

In a special election held recently, the voters of Fort Worth, Texas by a vote of 8,075 to 4,511 signified their approval of the city buying a natural gas system and operating it.

NEWS OF THE GAS INDUSTRY

Natural Gas Pipe Line Permit Granted

The North Central Gas Company of Casper, Wyoming was given permission by the Wyoming Public Service Commission to construct a natural gas pipe line from the Muskrat field in Fremont county, Wyoming to Central Eastern Wyoming cities and to serve them with gas. Some of the cities to be served are: Douglas, Glendo, Guernsey, Laramie, Lingle, Torrington and Wheatland. The applications of the Public Service Company of Nebraska and of Frank England of Casper Wyoming to serve the same territory were denied.

All Plans Ready to Start Big Gas Line

The Colorado Natural Gas Company, Arthur K. Lee, president, has everything arranged for the construction of a natural gas pipe line from the Hugoton field in Kansas to Colorado Springs, the gas due at the Springs in August. The city of Colorado Springs is to purchase the gas wholesale and maintain its own gas business. In building the line, the company will make arrangements to supply Ordway, Sugar City, Crowley, Olney Springs, Manzanola, Fowler and Canon City with jet gas service the earliest moment possible after the Springs service starts.

Bring in 15,500,000 Foot Well

Texas Gas Utilities Company has just brought in its largest well, with an open flow capacity estimated at 15,500,000 cubic feet per day, according to telegraph advices received by Applachian Gas Corporation, the parent company from D. H. Tucker, vice president of the company. The new well is on the company's Zavalla field holdings, and is the third large well to be brought in by Texas Gas Utilities Company since October, the other two having an open flow capacity of approximately 7,000,000 cubic feet per day each. The new well brings the company's total open flow capacity to approximately 75,000,000 cubic feet per day.

Uses Natural Gas Now

Carlinville is burning natural gas. It was turned into the mains recently. It is being supplied by the wells near Gillespie, which have been brought into production during the past summer. The company which is operating the wells and which is owned by Gillespie and St. Louis parties, is selling the product to the Illinois Power & Light Corporation, who for several years have been operating the utilities of this city.

United Gas Public Service Co. to Purchase Lake Charles Property

Negotiations which culminated in an agreement to purchase the Lake Charles, La., gas plant and city distribution system from the Gulf States Utilities Company were announced by the United Gas Public Service Company, a unit of the United Gas System.

Purchase of the Lake Charles system will make that city the headquarters of the entire division to be served by the new pipe lin enow under construction in Southwest Louisiana. D. S. McManus, division manager, already has temporary headquarters in Lake Charles.

The United Gas Public Service Company has obtained franchises in 38 Louisiana communities and has started construction of a natural gas pipe line project from Kirbyville, Texas, to Franklin, La., a distance of 158 miles, with 265 miles of lateral lines.

The Lake Charles system will be taken over officially when natural gas is available for distribution throughout the city about July 1st.

As soon as the necessary legal steps have been taken to close for the purchase of the gas property, engineers of the United Gas Public Service Company will be put in the field to develop plans for enlarging the system, making it ready for the distribution of natural gas. It is estimated that the cost of the improvements at Lake Charles will be nearly $100,000.

Fort Scott Company To Start New Work Soon

The Operating Department of the Union Public Service Company at Fort Scott, Kansas, is now making preparations for converting some of the existing lines in Fort Scott to an intermediate system.

This project upon completion, will make it possible to bring gas into the city from either of three sides. Regulator stations are to be located on the West, North and Southeast sides of the city.

It will also mean, in case of necessity, that the town will have continuous service if any emergency arises. Another feature of the project is that the pressure may be materially reduced. resulting in a large saving of line loss and leakage.

North American Light & Power Construction Program Announced

In a recent report, Clement Studebaker, Jr., president of the North American Light & Power Company, Chicago, stated that expenditures aggregating $15,000,000 will be required for new construction, extensions and improvements during 1931 and the Board of Directors will shortly be requested to authorize a construction budget of this amount. This figure is less than that of the 1930 budget primarily because of the lessened requirements on large developmental projects upon which the major portion of the construction work has been completed or is nearing completion.

The larger portion of the contemplated expenditures for 1931 will be made to extend and improve the electric, gas, railroad and miscellaneous properties to keep pace with the natural growth of demand for service and to more adequately provide and safeguard the quality of service. Substantial expenditures will also be required on the natural gas projects.

Public Service Co. of Northern Illinois Issues Annual Report

Operating revenues of the Public Service Company of Northern Illinois for the year 1930 were $35,405,093, an increase of $2,075,282, or 6.2 per cent, compared with the year 1929, according to the Company's annual report issued to stockholders this week. After the payment of $4,754,670, in dividends, $2,809,376 was carried to surplus, compared with $3,036,291 added to surplus in 1929.

The reductions in rates which the Company made during the year had the effect of reducing the increase in operating revenue and the amount available for surplus for the year by approximately $928,000. "From these figures," the report states, "it will be seen that the Company had a most successful year notwithstanding the generally depressed business conditions."

Total sales of electricity for 1930 were 1,195,446,343 kilowatt hours, or more than 13% increase over 1929. Gas sales for the year amounted to 7,509,748,700 cubic feet, exclusive of gas sold to neighboring gas companies.

Natural Gas Line Planned

The Texas Public Service Company are contemplating the laying of 77.5 miles of twelve inch pipe from Texon to San Angelo and 43 miles from Texon to the Pecos Valley power plant, customers for the consumption of the natural gas assured.

Eastern Natural Gas Regional Sales Conference Productive of Worth While Sale Ideas

THE Eastern Natural Gas Regional Sales Conference, sponsored by the Commercial Section of the American Gas Association was held at Hotel Schenley, Pittsburgh, Pa., February 26 and 27. Interesting papers were presented, followed by general discussions, which offered many worthwhile ideas pertinent to the subject of sales.

In his paper, "Our Commercial Future," Mr. E. R. Acker, said in part:

"In the interests of the broad development of its business the gas industry can afford to impose certain restrictions on its promotional activities as its contribution toward intelligent, economic competition in the industry. These restrictions are:

1. No price cutting or rebates.
2. No trade-in allowances.
3. No free installations.
4. No premiums.
5. Economically sound deferred payment plans.

"The violation of these restrictions, unless the public utility makes it possible for other dealers to share with them in such activities, immediately affects the business of independent dealers adversely. If, on the other hand, the public utility, because of its economic advantage in merchandising, is willing to take a loss in its merchandising activities, the amounts involved in the activities just mentioned could be expended in many other ways for the promotion of the sale of merchandise and could, in fact, be beneficial to the independent dealer rather than harmful. For instance, for increased advertising, for extension of its Home Service work, for greater educational work among its customers, for more effective demonstration and display, etc. It can be urged, of course, that the expenditure of the same amount in such activities as against premiums, trade-in allowances, etc., would not bring the same merchandise results. Probably not, in the direct sale of merchandise by the utility, but who can say that it would not result in a better overall operation, considering the utility, the dealers and the customers as a unit. A sales program for the public utility, based on the coordination of all of the interests involved in the furnishing of gas service to the customers and making use of all existing avenues of retail trade would represent a constructive as against a destructive policy. It would increase tremendously the sales effort behind the gas industry. It would create sales allies and reduce competition with other fuels now being pushed by plumbers and other dealers. It would take advantage of all existing sales organizations and increase greatly the knowledge of gas service in our communities. It would release personnel, sales effort and sales expense in the utility for more productive and intelligent planning and development of the business. It would transform a group of customer dealers from a critical or at least apathetic state to one of enthusiastic support and cooperation. In my opinion, it holds the greatest future for the gas industry."

"Auxiliary Heating," by Mr. R. F. Cleary, offered good suggestions for promoting the sale of fireplace heaters.

"If we admit," said Mr. Cleary, "there is a possibility that decoration of that empty hole under the mantel may be a factor in the sale, let us make our salesroom displays attractive. If we have a fireplace let's burn a heater in it even though we have to turn off a steam radiator or two on account of the additional heat.

"Let's change the heater in the fireplace often enough so that the many different styles available are brought to the attention of our customers.

"If we don't have a fireplace in the showroom, let's get one. A chair or two before a cozy fireplace is a great place to close difficult prospects.

"Let us try to get gas piped to the fireplace in new homes. It might be worth while even if we had to give the builder a "wood fire igniter" for nothing.

"Let us check up the number of fireplaces in our community so that we know what our potential is.

"Let us not be satisfied with an order for a range and a water heater for a new house. If it has a fireplace it is a prospect for a fireplace heater. List it as such and follow it up.

"Let us make a real effort to sell 'The Jones' in our community and when we sell them, tell about it. We're all still trying to 'Keep up with the Jones.'

"Let us call back on our fireplace installations. Remember they are usually in the living room where visitors are entertained and if they are high class, impressive installations, the visitors' names may be given to us as prospects.

"Let us get over the notion that fireplace heaters are a sideline to be sold only in the Fall. You can all recall some fine installations made in the Summer and we could make more of them if we tried hard enough.

"Let's start the active season with new, fresh models instead of discouraging the customer who wants something good, with a lot of leftovers from the previous season."

Mr. Fred M. Reiter's paper, "The Use of Gas for Heating Industrial Structures," contained much valuable information. Some of his observations are as follows:

"The choicest helps the gas unit heater lends us are:

"1. Lower investment in heating equipment, with the elimination of the boiler room, stack, coal storage, boiler insurance, water accessories, license requirements, and so on. Our experience in Dayton indicates a gross investment in a boiler system of $1.50 per sq. ft. of radiation; $1.10 for large steam unit heater installations; with $.30 to be added for boiler room, stack, etc., on new buildings; against an average outlay of about $.80 for an equivalent amount of heating capacity in the direct gas fired unit heaters. Figures noted in other localities seem to check these basic costs. In other words, the investment in a unit heater system is at least 33⅓% lower than a steam system.

"2. Decentralization of the heating system, the application of heat where needed, and the progressive and differential operation of groups of unit heaters with extreme simplicity. To this the gas engineer can add the gain in the heat delivery from the fuel to the point at which the ultimate heat is utilized, in comparing a remote boiler plant with the direct gas unit heater located at the point of heat requireme. t. One of the largest corporations in Dayton admitted that our 55c price per 1000 cu. ft. gas in unit heaters could compete with their 40c cost per 1000 lb. of steam, such costs including fuel, operation, and overhead. Based upon 5 lb. of coal per boiler H.P. of 345 lb. steam from and at 212° for an average stoker fired boiler for heating purposes with standby losses for low rating operations, for low grade slack coal at $3.75 per ton in the bins, the bare fuel cost would be $.28 per 1000 lb. steam, leaving a very slim margin of 12c to cover labor, maintenance, and overhead.

"3. Where necessary, financially, the additive purchase of heaters, as needed, can be accomplished, instead of a single outlay for the entire heating plant.

"4. The extreme flexibility and mobility of the unit heater. With the unit type of building becoming prevalent, with designs for additions in advance, the gas unit heater has had a decided appeal to the plant executive, when we consider the cost of initial investment in the boiler room, steam and coal systems, stack, etc., for a possible future expansion program that may never be realized. The gas unit heater demonstrates its merit during nonproductive periods, such as this past winter, in permitting the isolation of individual departments to operate as desired. With the central station heating plant, the system must be operated at low ratings, high overhead, and high heat wastes, at an unnecessarily high cost.

"5. The effective utilization of intangible process heat, combined with the more complete spread of this heat where needed.

"6. Unit heaters leave many steam heated process jobs to better gas application. At present many process operations take steam from a central plant, under conditions not truly best adapted for their

operation. Greater satisfaction would be obtained by the prospective customer by the proper application of heat to this process, regardless of the heating system, without imposing a low summer load upon the boiler plant.

"To these we might add briefly: simplicity of piping throughout the plant compared to steam lines, ease of control, and their adaptability to structures not originally planned for heating and ventilating."

The long experience of Mr. Thomson King in gas househeating was amply reflected in his paper, "Promoting Sales with Gas Designed Equipment."

"Experience in the sale of heating equipment," said Mr. King, "soon teaches us that the greatest technical difficulties that are met in its satisfactory sale and installation arise out of the fact that we are selling something which is not a complete unit in itself but must function as part of a system which we do not sell and over which we have had no control and which may or may not be correct and adequate for the work to be done. The majority of household appliances sold by utilities are more or less independent and complete units. The gas range, the vacuum cleaner and the domestic refrigerator are self-contained. They perform their duties without being dependent upon other appliances, but the gas boiler can only deliver steam and hot water to a system of pipes and radiators which in turn must deliver heat to the rooms and their occupants. It is, therefore, not sufficient to sell a good boiler or furnace of the proper size to secure the satisfaction of the cusomer. We must be assured that the piping, radiators and air ducts are correct and adequate and the chimney tight before we are sure of the satisfactory operation of the equipment we sell. The best and most efficient boilers and furnaces in the world may be condemned if the rest of the system is in poor shape.

"For these reasons the sale of central gas heating equipment assumes a larger and more complicated aspect than that of pure merchandising and demands of the men who would successfully undertake it, knowledge and experience beyond the appliances themselves and an ability to diagnose and correct troubles that may exist in many types of heating systems. The men employed to sell gas heating must be not only good salesmen, they must also be in many respects good heating engineers or have available the services of a good heating engineer, otherwise troubles multiply and inevitable loss and dissatisfaction result from their efforts."

Mr. Geo. L. Scofield, Dominion Natural Gas Co., Ltd., Buffalo, N. Y., spoke on "Regulating Stock and Increasing Turn-over." "Customer Contacts Through Home Service" was an interesting paper read by Mrs. Luella M. Fisher, Iroquois Gas Corporation, Buffalo, N. Y. "General Heat Application for Industrial Furnaces" was the title of a paper by Mr. F. H. Adams, Surface Combustion Co., Toledo, Ohio, and Mr. Thomas E. Wood, Manufacturers Light and Heat Co., Pittsburgh, Pa., delivered a talk on "Application of Luminous Flame Burner."

Mid-West Regional Sales Conference

The Mid-West Regional Sales Conference was held at the Hotel Sherman, Chicago, Ill., February 12th and 13th.

The papers read at the meeting had to do with the changed conditions in the industry in various parts of the country where natural gas had wholly or in part supplanted manufactured gas and the methods that various companies were using to increase their gas loads by the sale of domestic and industrial gas burning appliances. Each paper outlined the particular plan that the writer had adopted for the sale of appliances in his particular territory.

In a paper prepared by Mr. R. W. Gallagher, President of the East Ohio Gas Company, he presented some statistical data which showed the comparison of sales of manufactured and natural gas in 1919 and 1929. It showed that the total number of consumers in 1919 using manufactured gas was 8,484,000, natural gas 2,501,000. In 1929 the total number of consumers using manufactured gas was 12,139,000 and of natural gas, 5,116,000. In 1919 the percentage of manufactured gas consumed by domestic sales was 73%, industrial sales 27% and for natural gas, domestic 34%, industrial 66%. In 1929 the percentage of manufactured gas for domestic sales was 68%, industrial sales 32% and of natural gas, domestic sales 19% and industrial sales 81%. The total sale of gas for 1929 for both manufactured and natural gas was 2,441, 551,000 of which 30% was sold to domestic customers and 70% to industrial.

Mr. C. A. Luther, of the Peoples Gas Light & Coke Company, Chicago, announced that all of the papers and discussions would be issued in a bound volume as soon as possible after the meeting.

Convention Calendar

March

17-18 Ohio Gas and Oil Men's Association Convention, Deshler-Wallick Hotel, Columbus, Ohio. William H. Thompson, Secretary.

23-27 National Home Service Conference, Edgewater Beach Hotel, Chicago, Ill.

27 New Jersey Gas Association convention, Stacy Trent Hotel, Trenton, N. J. Herbert E. Cliff, secretary-treasurer.

30-Apr. 3 Gas and Fuel Division, American Chemical Society, Indianapolis, Ind. O. O. Malleis, Secretary, gas and fuel division.

April

2- 3 Empire State Gas and Electric Association, Gas Section, annual conference, Briarcliff Lodge, Briarcliff, N. Y.

8-10 A.G.A. distribution conference, Starrett Netherland Plaza Hotel, Cincinnati, Ohio.

8-11 Arizona Utilities Association Convention, Biltmore Hotel, Phoenix, Ariz.

10 Maryland Utilities Association, annual meeting, Lord Baltimore Hotel, Baltimore, Md.

13-15 Mid-West Gas Association, twenty-sixth annual convention, Julien Dubuque Hotel, Dubuque, Iowa. Joe Carmichael, 310 Crocker Bldg., Des Moines, Iowa, Director.

16-18 Missouri Association of Public Utilities, Excelsior Springs, Mo. Jesse Blythe, 103 West High St., Jefferson City, Mo., assistant secretary.

23-24 A.G.A. Accounting Conference, Stevens Hotel, Chicago, Ill.

28-30 Pennsylvania Gas Association, annual meeting, Galen Hall, Wernersville, Pa. Frank W. Lesley, secretary, 127 W. Market St., York, Pa.

May

1- 2 American Gas Association executive conference, Atlantic City, New Jersey.

11-14 Natural Gas Department, A.G.A., Peabody Hotel, Memphis, Tenn.

20-22 American Gas Association Production and Chemical Conference, Philadelphia, Pa.

June

2- 4 Institution of Gas Engineers, London, England, first international gas conference. J. R. L. Alexander, secretary.

4- 5 Canadian Gas Association convention, 24th annual meeting, Windsor Hotel, Montreal, Quebec, Canada.

9-11 Southern Gas Association, Chattanooga, Tenn. G. H. Schlatter Birmingham, Ala., secretary.

15-20 Domestic Appliance Course, A. G. A. Laboratory, Cleveland, Ohio.

22-27 American Home Economics Association, Book-Cadillac Hotel, Detroit, Mich

29-July 1 Michigan Gas Association, annual convention, Mackinac Island, Mich. A. G. Schroeder, secretary-treasurer.

September

(First week) Pacific Coast Gas Association convention, San Francisco, Calif.

October

12-16 American Gas Association, Atlantic City, N. J. Alexander Forward, 420 Lexington Ave., N. Y. C., managing director.

November

16-21 Third Annual Conference on Bituminous Coal, Pittsburgh, Pa.

(*News continued on page 80*)

From the inception of the Glover-West System of Continuous Carbonization in Vertical Retorts, great care has been taken to obtain and record the actual operating results, properly authenticated by independent and expert engineers and carbonizers.

These figures show actual technical results achieved with practically every known variety of gas coal in every part of the civilized world. They have now been compiled into a 230-page book, "Results in Glover-West Vertical Retorts."

This comprehensive volume presents facts of immediate and practical interest to gas companies now operating Glover-West plants or contemplating extensions.

West Gas Improvement Company

Builders of Coal Gas Plants

441 Lexington Avenue New York, N. Y.

Natural Gas Main Being Laid to Serve Columbus, Ga.

With permission granted by the Columbus, Ga. city council to cross the river from Alabama on the Dillingham Street bridge, natural gas will soon be turned on there. The main will be laid from Kaolin, Ala., to Columbus. at once. The new main will be constructed under the direction of James Neill, superintendent of the Birmingham district.

Appalachian Gas Corp. Subsidiary Gets Large Sales Contract

A contract calling for deliveries to Kentucky West Virginia Gas Company of 2,000,000 cubic feet of natural gas per day for the remainder of the present Winter season, and of 5,000,000 feet daily next Winter, has been entered into by Wayne United Gas Company, according to a recent announcement by H. E. Danner, vice president of Appalachian Gas Corporation, the parent company. Gas is delivered to the customer's pipeline near West Liberty, Ky., for transmission to Louisville, Ky.

Wayne United Gas Company, which owns or controls gas rights in approximately 45,000 acres in West Virginia, Kentucky and Ohio also sells gas to Libby-Owens-Ford Glass Company and Owens-Illinois Glass Company, under sales contract calling for 5,000,000 cubic feet of natural gas for daily delivery to the glass companies' plants in Kanawha City, W. Va. Appalachian Gas Corporation owns 91 per cent. of outstanding common stock of Wayne United Gas Company.

Large Plant Now Using Natural Gas

Natural gas has been turned on in the big plant of the Newport-Armstrong company at Pensacola, Fla. The Newport-Armstrong company produces naval stores from pine stumps, the residue being converted into wall-board. It is estimated that 1,000,000 cubic feet of natural gas a day will be burned.

Election of Officers

At a directors' meeting and stockholders of the Capital Gas and Electrical Company, Topeka, Kansas, recently, B. C. Adams was elected president; Judge Garver, vice president; E. B. Smith, secretary and treasurer, and G. J. Swan, manager.

Directors of the Capital Gas and Electric Company are: F. C. Coates, H. C. Coates, H. O. Caster and W. A Jones, all of New York; B C. Adams, R. D. Garver and Harry Warner, all of Kansas City; H. A. Russell, W. G. Swan and E. B. Smith of Topeka.

Courtesy, The Cincinnati Chamber of Commerce

St. Nicholas Plaza Hotel, Cincinnati, Ohio, where the American Gas Association Distribution Conference will be held April 8th to 10th

Fuel and Gas Engineering at Massachusetts Institute of Technology Completes Its Field Work

Tests of broad interest in several phases of fuel utilization marked the six months field work of the course in Fuel and Gas Engineering at the Massachusetts Institute of Technology now brought to a close. At the Tide Water Oil Company's refinery in Bayonne, New Jersey, gas and oil fired crude stills, solution stills and cracking coils were studied.

The efficiencies of a gas producer and a billet reheating furnace were determined at the Lackawanna Plant of the Bethlehem Steel Co. and extensive tests were made on the dry quencher and Koppers liquid purification system at the gas plant of the Rochester Gas and Electric Corporation. The 1400 pound boilers and turbines at the Edgar Station of the Edison Electric Illuminating Company of Boston were also subjects for part of the test work.

The field work follows a year's study in theory of combustion, natural and manufactured fuels, power development, furnace design, utility economics, fluid flow, heat flow and kindred subjects in the graduate course at Massachusetts Institute of Technology.

Natural Gas Permit Awarded

The public utilities commission of Wyoming awarded Frank Bautch and associates the necessary permit for the construction of a natural gas pipe line from the Lance Creek field in Wyoming to the city of Lusk, the gas to be used in Lusk for domestic purposes.

Northern States Power Co. Wins Harvard Advertising Award

W. H. Hodge, vice president and manager sales and advertising department, Byllesby Engineering and Management Corporation, announces that for the second consecutive year Northern States Power Company has won the Harvard Advertising Award for the best local advertising campaign conspicuous for the excellence of its planning and execution. This award carries with it a cash prize of $1,000. Announcement of the award was made at a dinner given by the Harvard University Graduate School of Business Administration at Boston, February 27, and the award was accepted by Mr. Hodge on behalf of Northern States Power Company.

The prize winning series of advertisements was prepared by T. H. Kettle, advertising manager of the company, under the supervision of the advertising department of Byllesby Engineering and Management Corporation. Mr. Kettle also prepared the series which won the award last year.

The advertising campaign winning the 1931 award consisted of a series of 23 advertisements known as the "Gas Service for the Home" series, which appeared in newspapers throughout the Northwest in communities where Northern States Power Company supplies gas service.

This is the first time in the history of the Harvard awards that an individual advertiser without agency assistance has been given the Harvard award twice.

Bill Imposing Tax on Gas Unfavorably Reported On

By the vote of 24 to 18, the ways and means committee of the Georgia house of representatives has reported unfavorably upon the Kennedy Bill.

This measure, would have imposed a tax of 10 cents per thousand cubic feet on all artificial and natural gas sold in the state.

Originally, the measure carried a tax of two mills on each kilowatt hour of hydro-electric power produced in the state. This was later reduced to one-half mill per kilowatt hour, while a proposed tax of four per cent of the gross telephone company receipts was reduced to 2½ per cent.

The reductions, however, failed to stem the tide of opposition to the measure, and it was unfavorably reported.

Authorize Stock Issues

The Indiana public service commission has authorized the Southern Indiana Gas and Electric Company to issue $750,000 in preferred 6 per cent stock to reimburse the company treasury for capital outlays for improvements.

(*News continued on page 82*)

STRONG LINKS » »
that make the chain complete

HEAT
LIGHT
POWER

GENERAL COAL COMPANY
PHILADELPHIA

BOSTON, CHARLOTTE, N. C., DETROIT, NORFOLK, CHARLESTON, S. C., CINCINNATI, NEW YORK, PITTSBURGH, BUFFALO, N. Y., IRWIN, PA., BLUEFIELD, W. VA.

Cities Service Net Earnings Show Increase

Net earnings of Cities Service Company for the twelve months ended January 31, 1931, were $56,553,823 as against $45,413,728 in a like period ended January 31, 1930, an increase of 24.53%. The total number of Common stockholders as of February 15, were 446,752, which is an increase of 7,877 since January 15, 1931.

Gross earnings increased from $46,795,692 for the year ended January 31, 1930, to $59,145,893, an increase of $12,350,200 or 26.39%. Interest and Discount on Debentures were earned 5.80 times.

Net to Stocks and Reserves increased from $38,303,959 to $46,804,981, an increase of $8,501,022 or 22.19%. Dividends on Preferred stocks were earned 6.36 times as against 5.52 times in the preceding year.

Net to Common Stock and Reserves increased 25.74% to $39,443,436 as compared with $31,368,554 for a like period ended January 31, 1930.

Gross and net earnings for the month of January, 1931, were $3,730,423 and $3,501,691, respectively, compared with $5,402,362 and $5,255,681 for January, 1930.

Coincident with the publication of its earnings statement, Cities Service Company announced monthly dividends of 2½ cents per share in cash and ½ of 1% in stock on the Common stock. Regular monthly dividends of 50 cents per share on the Preferred stock and Preference BB stock and 5 cents per share on the Preference B stock were announced, all payable April 1 to stockholders of record March 14.

Seneca Has Natural Gas

Work has been completed on The Kansas Pipe Line & Gas Company line to Seneca, Kansas, and residents are now using natural gas for the first time. The line serving the city is a four-inch main extending from the trunk line near Hanover.

P. W. Chapman & Co., Inc., Underwrite Additional Appalachian Gas Corporation Debenture Issue

P. W. Chapman & Co., Inc. have underwritten an additional issue of $1,750,000 of Appalachian Gas Corporation convertible 6 per cent debentures, initial series, due March 1, 1945, the proceeds of which will be used in connection with the acquisition of additional natural gas properties in nineteen counties in Ohio, including the entire capital stock of Trans-Ohio Gas Corporation, owners of a pipeline through which the Empire Steel Corporation in Mansfield, Ohio, is supplied with natural gas from the Ashland County field. The new properties which have been selling natural gas at wholesale to public utilities will be operated by Commonwealth Gas Corporation as a wholly owned subsidiary of Appalachian Gas Corporation and will have no funded debt in the hands of the public.

Gas leases in over 70,000 acres in the heart of the Ohio industrial area, not far from such cities as Akron, Canton and Massillon, are owned or controlled by the new subsidiary.

Derby Gas and Electric Company Open New Home

Impressive ceremonies marked the opening of the new office building and salesroom of the Derby, Conn., Gas & Electric Company recently.

The building is four stories high, the front of which is constructed of Indiana limestone. One of the features of the building is the provision for night illumination by five bronze lighting fixtures attached to the base of vertical piers on the front of the building which are designed to throw a vertical stereopticon ray, while on either side of the entrance and in each bay are affixed bronze lighting arrangements, similar in design, and arranged to cast colored rays upward contrasting with the other light effects.

Ample accommodation for the stock merchandise and display equipment is provided on the lower floor, which is attractively decorated. Small movable tables, built to the height of the marble sills inside the windows can be arranged for convenience and advantageous window display.

The upper floors are given over to the offices of the executive and clerical forces, including recreation rooms for employees.

Issue Annual Report

The Montreal Light, Heat & Power Consolidated have just issued their fourteenth annual report and list amongst other improvements and expenditures for 1930 a 10,000,000 cu. ft. gas holder, water gas generating equipment, 12,000,000 cu. ft. capacity and thirty miles of gas distributing mains in new territory.

with maximum safety and economy

WHETHER the job is a long gas line through the country or a main under city streets, the prime requisite is dependability. Dependability when the service begins—dependability through the years.

Starting off with the right pipe is the surest way to lay a line that will remain sound and dependable from end to end. The right pipe has high tensile strength, sufficient ductility, accurately finished ends, good welding qualities, resistance to corrosion—and is available in double random lengths. Such pipe gives promise of maximum safety and economy through the years to come. NATIONAL Pipe is the right pipe. That is why gas companies rely so generally on NATIONAL dependability.

Remember, NATIONAL double random lengths cut the number of joints to about one-half . . . reduce the possibility of leakage . . . and mean a considerable saving in time, labor and joint-making materials—another reason why NATIONAL is—

AMERICA'S STANDARD WROUGHT PIPE

NATIONAL TUBE COMPANY • Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

NATIONAL PIPE

PERSONALS

Frederic H. Hill, vice-president and general manager of the Elmira, N. Y., Water Light and Railroad Company, was elected president of that company to succeed the late Edward G. Connette, at a recent meeting of the board of directors.

Mr. Hill is general manager of the Southwestern New York group of the Associated Gas & Electric System. He went to Elmira in 1913 as chief engineer of the Elmira company and has rapidly risen in the utility field. Since July 1, 1913, he has been general manager of that company and vice-president since March 20, 1918. He is also a director in several other utility companies.

Leslie Weiss, general manager of the Easton-Dover division of the Associated Gas & Electric System, has been promoted to the position of general sales manager for the entire Pennsylvania-New Jersey System, extending from Union Mills, Md., to Dover, N. J. Mr. Weiss has his offices in Reading, Pa. He will have under his supervision all new business activities in the above area.

E. P. Bennett was recently appointed Manager of the Refrigeration Division of the Minneapolis, Minn., Gas Light Company. Mr. Bennett joined the Minneapolis Gas Light Company Refrigeration Department in June, 1929, and his promotion comes as a result of his work as floor manager and retail activities.

T. V. Flynn, Acting Superintendent of the Germantown-Frankford District of the Philadelphia, Pa., Gas Works Company, has been appointed Superintendent of that District.

E. C. Stone, System Development Manager of the Duquesne Light Company was recently appointed Assistant to F. R. Phillips, Senior Vice-President of the Philadelphia Company, Pittsburgh, Pa.

Theodore O. Ferkinhoff has been made Supervisor, Distribution Department of the Hammond, Ind., District of the Northern Indiana Public Service Company. Mr. Ferkinhoff was formerly Assistant Chief Inspector of the Inspection Department.

J. A. Carney, formerly chief salesman in the Aurora, Ill., District of the Western United Gas & Electric Company has been appointed Chief Clerk of the Sales Department. W. E. Froom, formerly chief salesman in the Wheaton District, succeeds Mr. Carney.

Elbert H. Sykes, formerly sales supervisor of the Northern Indiana Public Service Company at Michigan City has been transferred to the South Bend, Ind., District, where he will supervise sales.

F. N. Leonard is now Manager Retail Merchandise Sales of the Public Service Company of Northern Illinois, Chicago. Mr. Leonard has been with the company for more than twenty years and at one time was a member of the President's Training Course. Starting with the North Shore Electric Company in 1905, Mr. Leonard has had a variety of utility experience. After a number of years in operating and construction work, Mr. Leonard in 1918 became the Company's Safety Director.

Luella M. Fisher has recently been appointed as Directress in Charge of Home Service for the Iroquois Gas Corporation, Buffalo, New York, the United Gas Company, Oil City, Pennsylvania and the Pennsylvania Company, Warren,

Luella M. Fisher

Pennsylvania and affiliated companies. Her work will consist of organizing and operating Home Service Departments in the various territories served by these companies.

Mrs. Fisher is well known in the gas industry and has wide experience in Home Service activities. She was formerly affiliated with the Eriez Stove and Manufacturing Company of Erie, Pennsylvania, and the East Ohio Gas Company of Cleveland, Ohio. In 1929 she served as chairman of the Home Service Committee of the American Gas Association and this year she has held the chairmanship of the publicity section of that committee.

F. Hainer has been appointed Assistant District Manager of the Wisconsin Power & Light Company, Fond du Lac, Wisconsin. Mr. Hainer's new duties will put him in touch with all engineering projects of the district. He will also supervise all industrial installations, both gas and electric, and have charge of gas distribution, coke sales, and high pressure gas lines.

R. O. Pitman has been transferred from the Nebraska Distributing Company at Superior, to the St. Joseph Gas Company, St. Joseph, Mo., where he will be new business supervisor. Mr. Pitman formerly was supervisor at the Kansas City Gas Company and prior to that time was connected with the New Business Department at the Capital Gas and Electric Company.

Edward H. Stachel is now sales supervisor of the Northern Indiana Public Service Company at Michigan City, Ind. He was formerly at Elkhart, Ind. George W. Dresser is now acting sales supervisor at Elkhart.

Elmer A. Edkins has been appointed sales supervisor of the Valparaiso, Ind., District of the Northern Indiana Public Service Company, succeeding Paul L. Tucker, who was transferred to Warsaw.

L. L. Dorr has been transferred to the Union Public Service Company, Minneapolis, Kansas. Mr. Dorr was formerly house heating engineer for the Western Distributing Company.

J. A. Collins succeeds R. O. Pitman as New Business Supervisor of the Nebraska Distributing Company at Superior, Nebraska. Mr. Collins started as a salesman at the Kansas City Gas Company and was later made supervisor, which position he held up to the time of his transfer to Superior.

John Walters was recently appointed gas plant superintendent of the Northern Illinois Utilities Company at Belvidere, Ill. He was formerly located at DeKalb.

Leslie M. King, who has been in charge of new business activities at the Nebraska Distributing Company in Falls City has been made manager of the Urban Service Company properties located at Carrollton, Concordia and Sweet Springs, Mo.

Mr. King will make his headquarters at Carrollton, where natural gas was recently turned into the mains.

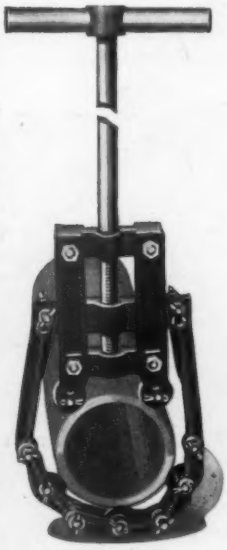
Claude Gates, who has been New Business Manager of the Capital Gas & Electric Company in Topeka, Kansas, for the past year, has been transferred by the Gas Service Company to the General Offices in Kansas City, Mo.

Mr. Gates, in his new position in Kansas City, will work directly under F. M. Rosenkrans, general sales manager of the Gas Service organization, and will assist Mr. Rosenkrans in directing the department. Mr. Gates has held a number of responsible positions with the company which has given him a wide and valuable experience.

C. E. Dotson of the new business department of the Witchia, Kansas, Gas Company, has been put in charge of the Electrolux sales division of the company.

(*Personals continued on page 86*)

POLLARD PIPE LINE EQUIPMENT



Four Pollard Products are shown on this page ask for Catalog 14H showing complete line.

POLLARD DERRICKS

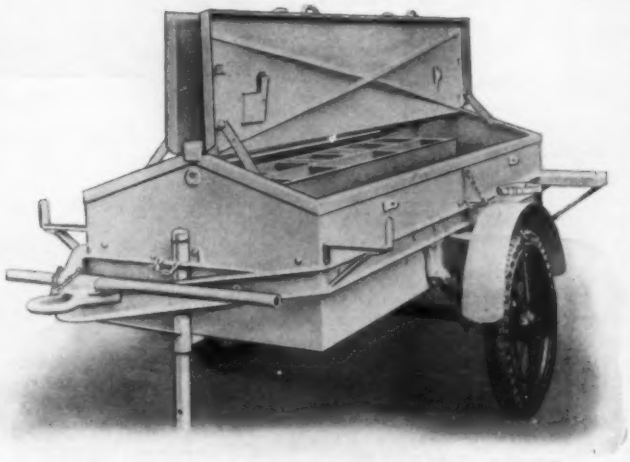
Sulky Derrick—ideal for raising or lowering heavy pipes and valves. Can be rolled on wheels like a cart or hauled like a trailer. Other types of derricks, 1 to 7 ton capacity.

POLLARD PIPE CUTTER

This device makes all cuts clean without danger of breaking pipe or disturbing joints. Cuts all kinds of pipe from 4 to 12 in. Cuts can be made in the trench without extra excavating.

PORTABLE LEAD MELTING FURNACE
(Gasoline Burner)

Furnace can be quickly moved from joint to joint. Equipped with latest Hauck gasoline vaporizing burner melting 200 lbs. lead in 15 minutes. One of many types.



POLLARD TRAILER CARTS

Offer these advantages: All steel construction, thief-proof, weather-proof, racks for pipe, bench for vise, lantern holder, compartments for tools, cover locking device. Furnished in sizes and designs to meet every requirement.

JOSEPH G. POLLARD CO., Inc.

Western Warehouse
1749 West Lake St., Chicago, Ill.

Main Office
142 Ashland Place, Brooklyn, N. Y.

Canadian Distributor: Francis Hankin & Co., Ltd., 2028 Union Ave., Montreal

Severe Godin, Jr., replaces Hon. H. B. Rainville as a director of the Montreal Light, Heat & Power Consolidated, it was announced recently following the annual general meeting of the shareholders of the company. Hon. H. B. Rainville, who has been a director of the company for thirty-two years, had, owing to continued ill health, tendered his resignation from the Board.

Mr. Godin has been connected with Montreal Light, Heat & Power Consolidated since 1905 and was appointed secretary to Sir Herbert S. Holt, president, in 1916. While continuing officially in that position up to the present time, Mr. Godin has, of late years, been actively identified with the financial structure of the company.

W. W. Stein has been placed in charge of the new pipe line division added to United Gas System through the purchase by the United Pipe Line Corp. of lines extending from Jackson, Miss., through Mobile, Ala., to Pensacola, Fla. Mr. Stein was formerly manager of the Laredo Division of the Distribution Department. He will make his headquarters at Jackson, Miss.

Louis L. Roesle succeeds Claude Gates as New Business Manager of the Capital Gas & Electric Company, Topeka, Kansas. Mr. Roesle was formerly connected with the Customer Ownership Department of the Gas Service Company at Kansas City, where he made a fine record.

George H. Ahlborn, Topeka district manager of the Kansas Power and Light Company, has been appointed manager of the Northeast Kansas district with headquarters at Atchison, Kansas. Prior to coming to this company, Mr. Ahlborn was connected with the Kansas Gas & Electric Co., at Wichita.

D. W. Hannon has been promoted to the position of Commercial Manager of the Illinois Power and Light Corporation at Danville, Ill.

S. D. Darley, formerly commercial manager of the Illinois Power and Light Corporation at Danville, has been appointed Commercial and Industrial Sales Engineer. Mr. Darley was formerly commercial manager of the Jacksonville Division and came to Danville in September, 1929, as commercial manager.

R. E. Sams, former Chief Clerk of the San Bernardino office of the Southern California Gas Company has been transferred to the Banning District where he has been appointed Acting District Agent. E. A. Stowe will fill the position vacated by Mr. Sams at San Bernardino.

C. D. Bell, for thirteen years an executive with the Southern California Gas Company, was recently retired by the Company. Mr. Bell, born in Pittsburgh, Pa., spent many of his early years in the gas industry both in the east and the middle west, being connected with the Philadelphia Gas Company, the Parsons Gas Company, Natural Gas Company in Joplin, Mo., and the Kansas Natural Gas Company. He came from the latter company to the Southern in 1917.

Joseph McKinley has been appointed acting vice-president in charge of sales and service of the Duquesne Light Company and the Equitable Gas Company, Pittsburgh, Pa.

Mr. McKinley succeeds George E. Whitwell, who has accepted a position with the Philadelphia Electric Company,

Joseph McKinley

Philadelphia, as vice-president in charge of sales.

Mr. McKinley was born on May 31, 1877, in Pittsburgh, Pa. He received his education in Pittsburgh public and high schools, following which he entered Pennsylvania State College and was graduated from that institution in the class of 1900 in electrical engineering. Following his graduation he entered the employ of the Westinghouse Electric and Manufacturing Company. In 1903 he entered the employ of the Allegheny County Light Company, now the Duquesne Light Company. He was the first power salesman for the company and later served as manager of power sales, general contracting agent, manager of the wholesale sales and service department of the Duquesne Light Company and Equitable Gas Company.

Clark P. Read, general auditor of the Lone Star Gas Co., has been transferred to Omaha, Neb., as general auditor of the Northern Natural Gas Company and affiliated companies.

H. P. George, General Superintendent, Natural Gas Production and Transmission, will head the new Gas Accounting Bureau of the Southern California Gas Company, Los Angeles, Cal. All matters pertaining to gas purchase, gas transportation, wholesale sales, special industrial sales and inter-company operations will be handled by the Bureau.

D. S. McManus, who has been superintendent of gas, water and buses of the Gulf States Utilities Company, was recently named Division Manager of the United Gas Public Service Company, Southwest Louisiana Division. He is in charge of the distribution system in all towns served by this company. Mr. McManus has established temporary offices in Lake Charles, La.

Roy Bledsoe, who has been new business manager of the Union Public Servic Co., at Fort Scott, Kansas, since June 1929, has been transferred to the New Business Department of the Kansas City, Mo., Gas Company, as a Sales Supervisor. Robert Brosius, manager of the Fort Scott company will assume direct charge of sales department there.

T. S. Cowan, formerly of Liberty, N. Y., has succeeded P. J. Charron as New Business Manager of the New York State Gas & Electric Company at Mechanicsville, N. Y. Mr. Charron has been transferred to Liberty.

V. M. Johnson, Secretary of the Central Power Company, Grand Island, Nebraska, has assumed the duties of General Manager. Howard Kyle is now secretary of the company.

John Hoge is now Vice-President in Charge of Operations of the Central Power Company, Grand Island, Nebraska.

R. H. Paterson, in addition to his duties as manager of the Arlington, Mass., Gas Light Company and the Lexington Gas Company, assumed a similar position recently in the Woburn, Mass., Gas Light Company. He succeeds R. C. Brehaut who left the company to join the forces of a subsidiary of the Washington Gas Light Company.

Arthur C. Phenicie, formerly employed as Industrial Gas Salesman at Sheboygan, has accepted a position as Sales Manager of the Wisconsin Fuel and Light Company at Manitowac.

F. J. Gillmore, formerly superintendent of the gas plant of the Northern Illinois Utilities Company at Belvidere, has been transferred to DeKalb where he will serve in a like capacity.

R. J. Rutherford, vice-president and general manager of the Union Gas & Electric Company of Bloomington, Illinois, for the past two years, has resigned to become superintendent of the gas utilities of Worcester, Cambridge and New Bedford, Mass., with headquarters at Cambridge. The New England Gas & Electric Association controls these properties.

The Roberts *Junior*

Completes the Roberts Line

Heat YOUR HOME with Gas

THE Roberts *Junior* Burner was designed and built as a companion to the Roberts Standard Burner. *It Completes the Roberts Line.*

The Roberts *Junior* Burner meets the demand for a quality burner at a price within the reach of the modest pocketbook.

Learn the full story of the Roberts *Junior*. Gladly will we send full information without the least obligation.

ROBERTS-GORDON
APPLIANCE CORPORATION
CURTISS BLDG. BUFFALO, N. Y.

Trade Mark

ROBERTS
CONTROLLED
GAS HEATING UNIT

TRADE NEWS

United Engineers & Constructors Activities

Contract has been awarded by New York Power & Light Corporation, Albany, N. Y., to furnish, deliver and erect one 6′ generator with linings and other necessary parts, at the Gloversville Gas Works, Gloversville, N. Y.

Contract has been awarded by The Tampa Gas Company, Tampa, Florida, for furnishing, delivering and installing The U. G. I. Heavy Oil Process on two (2) 11′ U. G. I. Water Gas Sets for the use of Bunker "C" Fuel Oil.

Contract has been awarded by Nashville Gas & Heating Company, Nashville, Tenn., to furnish, deliver and install at Nashville, Tenn., one (1) 2000 M cu. ft. tank type holder, with foundations, gas connections, and auxiliary equipment.

Contract has been awarded by Philadelphia Electric Company, to furnish, deliver and erect at the Tilghman Street Works, Chester, Pa., one truck scale and scale house.

Surface Combustion Corp. Donates Furnaces to University

Surface Combustion Corporation of Toledo, Ohio, has given three S C Rated Gas-Fired Furnaces to the University of Toledo to be used for experimental study in Metallurgical Laboratory of that institution.

The three furnaces consist of a No. 724 Small Oven Furnace which will be used for hardening and annealing operations, a No. A-45 High Temperature Oven used for high speed steel treatment at temperature between 1800° and 2600° F, and a No. 910 Pot Hardening Furnace used for practically all hardening operations.

Recent Contracts Received by The Western Gas Construction Co.

Allied Engineers, Incorporated, Jackson, Michigan, have awarded contract to furnish, deliver and erect at the plant of the Consumers Power Company, Kalamazoo, Michigan one (1) Liquid Purification Plant (Seaboard Process) having a capacity of 4,000,000 cu. ft. of gas per day.

Allied Engineers, Incorporated, Jackson, Michigan, have awarded contract to furnish and deliver to the Consumers Power Company, Kalamazoo, Michigan, approximately four hundred and fifty feet (450′) of 20″, 24″ and 30″ welded steel pipe.

The Consolidated Gas Electric Light & Power Company of Baltimore, Maryland, have awarded contract to furnish, and deliver to their Spring Gardens Station, Baltimore, Maryland, one (1) 12′0″ A.B.C. Generator Grate.

Jersey Central Power & Light Company, Asbury Park, New Jersey has awarded contract to furnish, deliver and install at Long Branch, New Jersey, one (1) 29′0″ x 35′0″ x 13′0″ deep welded steel purifier, of the elevated type, complete with supports, gantry crane and pipe connections.

Lattner to Announce New Line of Gas Boilers

The P. M. Lattner Manufacturing Company will shortly announce a new line of gas fired high pressure, one hundred pound boilers. These new boilers are built on an entirely new principle of boiler construction, and will present a radical departure from the commonly known methods of obtaining heating surface in boilers.

This new boiler will be more efficient than the present Lattner tubular boiler. It will have no tubes. It will have no coils. It will have all the long life advantages of the ordinary flueless boiler.

The P. M. Lattner Manufacturing Company have had this new type of boiler on test for two years. New machinery is now being placed in the Cedar Rapids, Iowa factory and production on the new boiler should start within sixty days.

Free Film Service

The Sprague Meter Company has recently brought out two 400 foot reels of 16 mm., non-enflamable, films depicting "The Manufacture of Sprague Cast Iron Gas Meters."

These pictures were made under the direction of the plant engineer and are highly instructive as well as entertaining. The film starts out with the pouring of several tons of molten iron and carries one through the various processes of manufacturing with its highly specialized machines such as multiple drillers, tappers, valve lapping machines that are almost human in their action together with batteries of Brown and Sharp automatics and straight line conveyorized systems that assure accurate manufacturing of Sprague Meters to the final testing painting and packing of their product.

These films are available on loan and requests for them should be addressed to the Sprague Meter Company at Bridgeport, Connecticut. This is the latest service the Sprague Meter Company offers to Public Utility Companies, meter and engineering schools, etc.

J. Stover Western Representative for Peerless Mfg. Co.

Jerry Stover, formerly sales manager of the Utah Gas & Coke Company of Salt Lake City, is now representing the Peerless Manufacturing Company of Louisville, Ky., in Western territory, making his headquarters in Kansas City. His territory will extend from Kansas City to Salt Lake City.

Bristol Company Issue New Bulletin

Bulletin No. 3102 has recently been issued by the Bristol Company, Waterbury, Conn., featuring Bristol's Long Distance Transmitting and Recording System as applied to Gas Distribution. System. This bulletin contains complete description of the System and diagrammatic sketch showing how it operates, also various other illustrations. Copy may be obtained from the Bristol Company upon request.

Cooper-Bessemer Offers Free Manual on Engine Indicators

A valuable contribution to greater power efficiency in the oil and gas industry is the 34-page handbook written by Mr. Hewitt A. Gehres, chief engineer of The Cooper-Bessemer Corporation.

The textbook explains in detail how to use and read an engine indicator on 2 and 4-cycle gas engines, and on compressor cylinders. How to determine compression pressure; peak pressure; terminal pressure; back pressure; ignition timing; valve timing; mixture conditions; prematures—these and many other points of correct operation are answered clearly and authoritatively.

A copy is offered free to any reader who states his title and sends the request on his company letterhead to The Cooper-Bessemer Corporation, Mt. Vernon, Ohio.

Link-Belt Co. Appoint Kentucky Agent

Link-Belt Company, Philadelphia, Penna., announce that Joe C. Tucker, Morganfield, Kentucky, has been appointed agent in his territory for Link-Belt Portable Loaders, such as the "Cub" Portable Belt Conveyor and the "Grizzly" Crawler Loader described in new folder No. 1256.

(Trade News Continued on Page 90)

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR
METER CO.
167-41st Street
Brooklyn, N. Y.

ARE YOU AUTOMATICALLY CONTROLLING YOUR TEMPERATURE ?

Here are two 1300 gallon tanks used for Rust Proofing and Rinsing with Partlow Equipment automatically controlling the temperature.

One half of the tanks showing, lower half below the floor.

Heated by Partlow Burners firing through an immersion coil. Burners located below the floor. Individual blowers for each tank, controlled by Partlow Contactors and Duplex Valves.

By checking with a separate thermometer at the point of control, the tanks never vary more than four degrees Fahr.

The tanks are covered by two inches of insulation and have covers of this thickness. Using only 1060 C.F.H. of 530 B. T. U. gas, the tanks were up to the desired point, 210° Fahr. in three hours. The total gas consumed in bringing both tanks to temperature was 6360 C.F.H.

Our engineers will gladly furnish information applicable to your individual problem.

THE PARTLOW CORPORATION

2 CAMPION ROAD NEW HARTFORD, N. Y.

Two New Blower Bulletins Issued

The Roots-Connersville-Wilbraham Division of The Stacey Engineering Company has just issued two new bulletins, 21-B10 and 21-B11, covering the new line of Victor-Acme Blowers. In combining the Victor and Acme lines, a wider range of capacities than formerly possible, is now offered. Two new types, the "AF" (anti-friction bearing) and "AFS" (anti-friction bearing and hardened steel gear) blowers have also been added and are explained in the bulletins. Descriptive bulletin 21-B10 and the price list bulletin 21-B11, replace both the bulletin 121 formerly issued on Victor Blowers by The Connersville Blower Company, Inc., and bulletin 21-B2 on Acme Blowers by The P. H. & F. M. Roots Company.

Stockland Equipment Sales Becomes Link-Belt Agent

Mr. L. P. Spillan, Sales Manager of the Shovel and Crane Division of Link-Belt Company, Chicago, announces the Stockland Equipment Sales Company, 2628 University Avenue, S. E., Minneapolis, Minnesota, as their Shovel-Crane-Dragline Agent in Minnesota, (excepting a few counties around Duluth), and part of Central West Wisconsin.

Mr. J. W. Chapman, General Manager of Stockland Equipment Sales Company, has for many years been active in that territory. Sales representatives of his organization have permanent offices at Thief River Falls, Marshall, Brainerd and St. Paul, Minnesota, and at Barron, Mauston, and Eau Claire, Wisconsin.

Catalog Describes Swartwout Industrial Ovens

Catalog No. 31 has just been issued by the Foundry Equipment Company, Cleveland, Ohio, describing Swartwout Industrial Ovens for japan, enamel, paint and lacquer drying, armature and insulating varnish, baking, lithographing, ceramic drying, rubber curing, low temperature heat treating, chemical drying and other manufacturing processes requiring temperatures up to nine hundred degree Fahrenheit.

The catalog contains a complete description of the Swartwout Oven Design and valuable information on the use of various types of fuels and heating equipment, together with many illustrations and diagramatic layouts of representative installations.

Swartwout Industrial Ovens are manufactured by the Swartwout Oven Division of the Foundry Equipment Company, located at 1831 Columbus Road, Cleveland, Ohio. Copy will be furnished upon request.

C. A. Olsen President of The Fox Furnace Company

Following a recent meeting of the Board of Directors, C. A. Olsen succeeded W. H. Hill as President of The Fox Furnace Company, Elmyria, Ohio. Mr. Hill has been made Chairman of the Board and will, in the future, make his headquarters in New York City.

The new president is well known in the furnace industry. He has played an active part in the affairs of the National Warm Air Heating Association and the Furnace Institute.

The Fox Furnace Company is a division of the American Radiator & Standard Sanitary Corporation. They manufacture cast iron and steel furnaces, gas furnaces, air conditioning units and circulating heaters.

Members of the Industrial Gas Division of the New England Gas Association grouped in front of the Bristol Company's plant, Waterbury, Conn. The January meeting and series of inspection trips was held at Waterbury and Meriden

Spencer Thermostat and General Plate Company Combine

The Spencer Thermostat Company of Cambridge, Massachusetts, manufacturers of Klixon controls and the General Plate Co. of Attleboro, Mass., manufacturers of precious and thermostatic metals have combined, but will continue as separate units of metals and controls corporation. The identity and personnel of each organization will remain unchanged. This combination will provide greater research, manufacturing and sales facilities for each company.

The new address of the Spencer Thermostat Company is 34 Forest Street, Attleboro, Mass.

McWane Cast Iron Pipe Co. Opens Kansas City Office

The McWane Cast Iron Pipe Company announced the opening on March first of its newest sales office, at 1006 Grand avenue, Kansas City, Mo.

This office, which will have charge of the company's sales of gas pipe and fittings in the territory covered by Kansas, Nebraska, Missouri (except St. Louis) and northern Oklahoma, will be in charge of Mr. Cooper H. Allen, formerly connected with the McWane offices in Chicago.

The Kansas City office is the eleventh in the chain of McWane-Pacific States Cast Iron Pipe interest offices located at strategic points across the country, and will relieve its Chicago, Dallas and Denver offices of areas heretofore difficult to reach as frequently as their importance demanded.

Kloenne Waterless Gas Holder Ordered for Paris

It is understood that contract has been placed with the firm of Aug. Kloenne, Dortmund, Germany, through their French Licensees covering a Kloenne waterless gas holder of approximately 3,500,000 cubic feet capacity for the City of Paris, France. Stacey Bros. Gas Construction Co., Cincinnati are the U. S. licensees of the Kloenne Holder.

W. C. Katker Re-Elected President Favorite Stove Co.

W. C. Katker, for three years President of The Favorite Stove & Range Company, Piqua, Ohio, was recently re-elected for the coming year by the stockholders of the corporation.

Patents Pending

Patents Pending

If it hasn't got a RED WHEEL it's not a MAGIC CHEF

TWO Attractively Priced MAGIC CHEF Models that will Stimulate Gas Range Replacements

MAGIC CHEF, in both the Tiffin and Doric Models, completely satisfies the demand for modern style and beauty in gas ranges. Both of these Magic Chefs are thoroughly dependable and efficient cooking units, each of ample capacity to serve ten people.

Yet the retail prices are low enough to meet successfully the sales competition of ordinary gas ranges which Magic Chef now makes obsolete.

These beautiful and attractively priced Magic Chefs are bound to create a demand that will stimulate replacement of old gas ranges. They are substantial business builders that are certain to result in increased prestige and profits for every dealer who handles them.

For full details write American Stove Company, Department C, 801 Chouteau Avenue, St. Louis, Mo.

Magic Chef

AMERICAN STOVE COMPANY • **World's Largest Manufacturer of Gas Ranges**

NEW YORK · PHILADELPHIA · ATLANTA · CLEVELAND · CHICAGO · ST. LOUIS · SAN FRANCISCO · LOS ANGELES

AN IMPORTANT ANNOUNCEMENT

to every gas man selling

DOMESTIC GAS APPLIANCES

In response to many requests the series of articles which appeared in the American Gas Journal from Sept., 1929 to Jan. 1931 under the title

"Gas Utilization Technology for the Domestic Salesman"

by A. M. APMANN

has been revised and will be issued in book form about April 1st, under the title of

"DOMESTIC GAS APPLIANCES"

This book presents first-hand facts and data,. profusely illustrated, concerning every type of domestic appliance which uses gas as a fuel, and is of special interest to gas men interested in the sale of such appliances. Mr. Apmann has made an intensive study of gas utilization and therefore writes authoritatively on this subject.

Listed below are the chapter titles of the book which are indicative of its comprehensive scope. A list of pertinent questions on each chapter will be included, which adds to its value as a real text book on **Selling gas appliances.**

I. Competitive Fuels
II. Manufactured and Natural Gas
III. Comparative Fuel Costs
IV. Capacity of Pipes, Meters and Gas Orifices
V. Appliance Installation
VI. The Gas Range
VII. Gas Range Accessories
VIII. The Gas Water Heater
IX. Water Heater Accessories
X. Gas for Househeating
XI. The Househeating Furnace and Accessories
XII. Calculating Househeating Requirements
XIII. Miscellaneous Househeating Considerations
XIV. Space Heaters
XV. The Health Givers of the Cellar, Incinerator and Laundry Equipment
XVI. Gas Refrigeration
XVII. The Future of Gas Utilization.

American Gas Journal
53 Park Place, New York

I am interested in securing a copy of "DOMESTIC GAS APPLIANCES"

Please send me further information regarding this book.

Name .....

Position .....

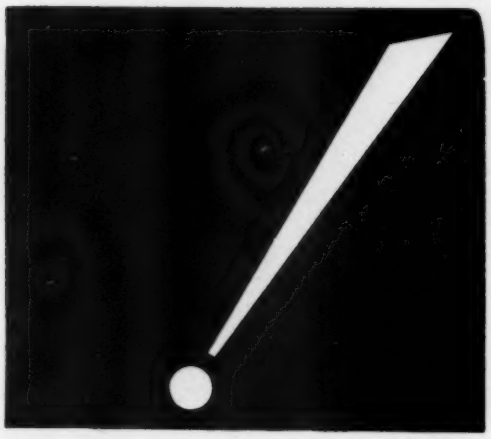
Address .....

175 PAGES, 5½ x 7

AMERICAN GAS JOURNAL

53 Park Place, New York

"PATROL FLASH"

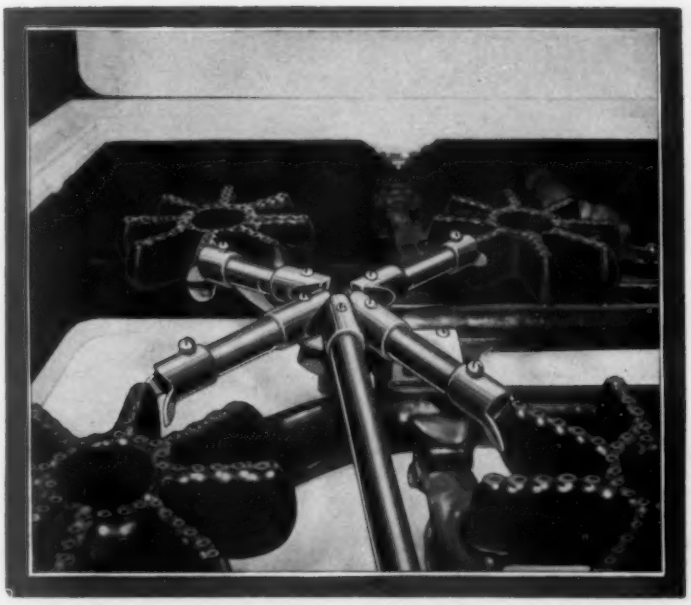


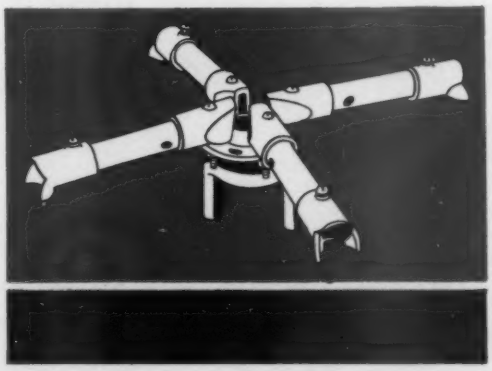
"PATROL-Flash" lighter for gas ranges is a sales feature — to sell gas ranges. There have been few improvements in the gas range with such immediate appeal to the customer.

Or so low in price.

Few with such interest compelling demonstration features — with so much to talk about. It is a convenience that delights the woman. Ask her.

She merely turns on the gas with one hand. The burner flashes aflame instantly. No other manipulation or operating tricks to learn.





"Patrol-Flash" is thoroughly automatic. "Patrol-Flash" is pretty. Finish is dull nickel. A. G. A. approved on several ranges. It is a thoroughly "engineered" product—produced by well-known engineers in the gas appliance industry.

• • •

Extra tubes for simmer burner and oven lighting furnished with standard model "Patrol-Flash" lighter at slight additional cost.

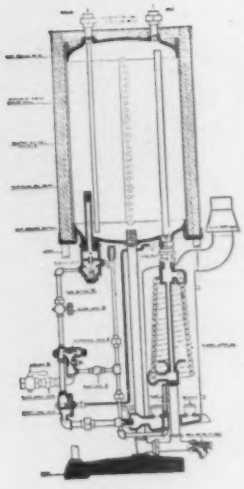
THE PATROL VALVE COMPANY

Cor. Locust Ave. and W. 114th St. . Cleveland, Ohio

Tick-Tock—Cheap-Good The Pendulum Swings

In the introductory days, cheap prices are ruling factors. Automatic Storage Water Heaters are no exception. For three years the cry has been only for more units—cheaper prices. But the pendulum swings. Cheap merchandise of inferior materials never can give satisfaction, and as the public gradually learns to discriminate, the demand is for the best.

For over eight years Kompak has made nothing but copper and bronze. Steadfast to an ideal, confidence in an industry that would finally demand the best, Kompak is today the outstanding value in the market, outstanding in quality of material and labor, outstanding in hot water service and economy.



THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK

NEW JERSEY

KOMPAK
TRADE MARK REG.

New! THE AD·KIT

IDEAS RECRUITED FROM THE EXPERIENCE OF MANY GAS COMPANIES

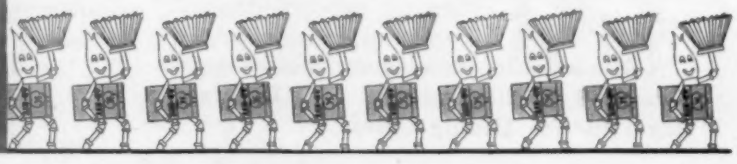
IS NOW READY FOR SERVICE!

Here is a new selling tool for the Gas Industry! It is a careful summary of successful merchandising and advertising ideas used by the Industry in selling house-heating equipment. The SC AD-KIT will guide you in quickly marshalling *your own ideas* into effective campaigns this spring... for Janitrol . . . for Columbus Gas-Fired Furnaces.

Briefly the principal units of the AD-KIT are:

1. **"Advertising GAS the Better Fuel for Home Heating" —32-page book illustrating use of Ad-Kit material, review of successful newspaper and direct mail campaigns, contests, sales promotion methods used by prominent Gas Companies, window displays, merchandising plans, etc.**
2. **Layout Pad for designing your own newspaper advertisements.**
3. **Suggested newspaper advertisements for JANITROL.**
4. **Suggested newspaper advertisements for COLUMBUS Furnaces.**
5. **Miscellaneous Cut and Mat Service from which you can build your own newspaper advertisements.**
6. **Direct Mail Pieces on both Janitrol and Columbus Furnaces which will tie in with your own localized plans.**

Ready for distribution soon . . . *Write for it!*



• • • SUBSIDIARY OF HENRY L. DOHERTY & COMPANY • • •

Surface Combustion

SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO • • SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

for MIXING Gases

there's the

CF

Differential Regulator

Use No. 1—To maintain a constant pressure ratio (differential) between manufactured and natural gas.

Use No. 2—To maintain a constant rate of flow, or line pressure.

Use No. 3—To check the flow of, and prevent the escape of, large volumes of gas when breaks occur in line or holder.

In any of these three services, this regulator gives the same efficient results that the gas world expects from all *C-F* products for gas regulation.

A free bulletin explains the special applications and abilities of the *C-F* Differential Regulator for Mixing Gases.

THE CHAPLIN-FULTON MFG. Co.

28-40 PENN AVE. PITTSBURGH, PA.

TRADE CATALOGS

Published by manufacturers of Gas Equipment and Appliances for you. Order by number, using coupon on Page 104.

PLANT EQUIPMENT

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The Western Gas Construction Co. 88
ADVANTAGES OF WELDED CONSTRUCTION
Western Gas Construction Co. 451
"AMERICAN" GAS AND METER TESTING APPARATUS
American Meter Co. 320
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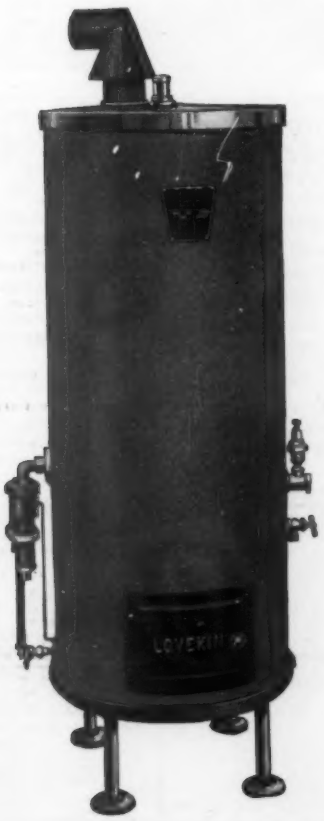

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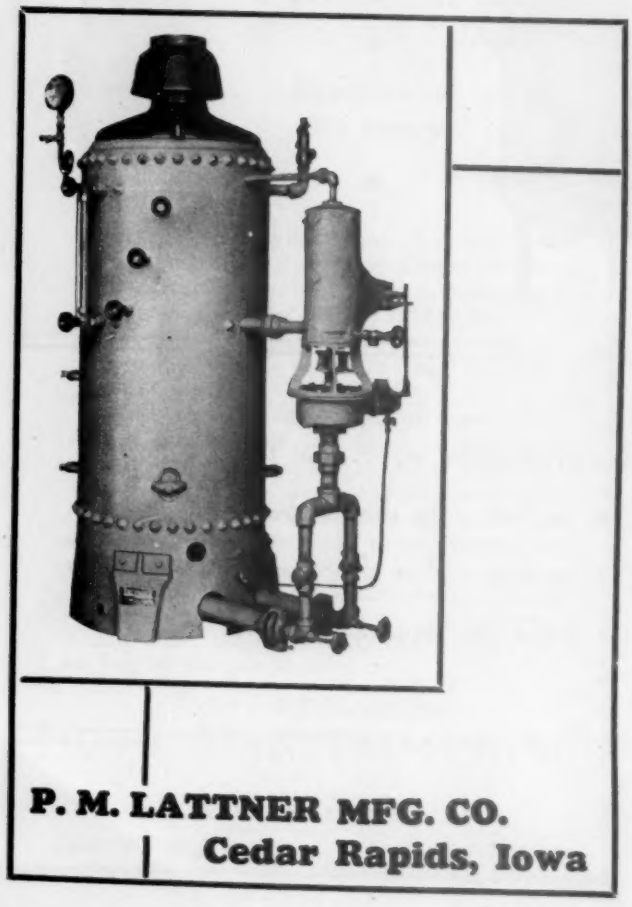

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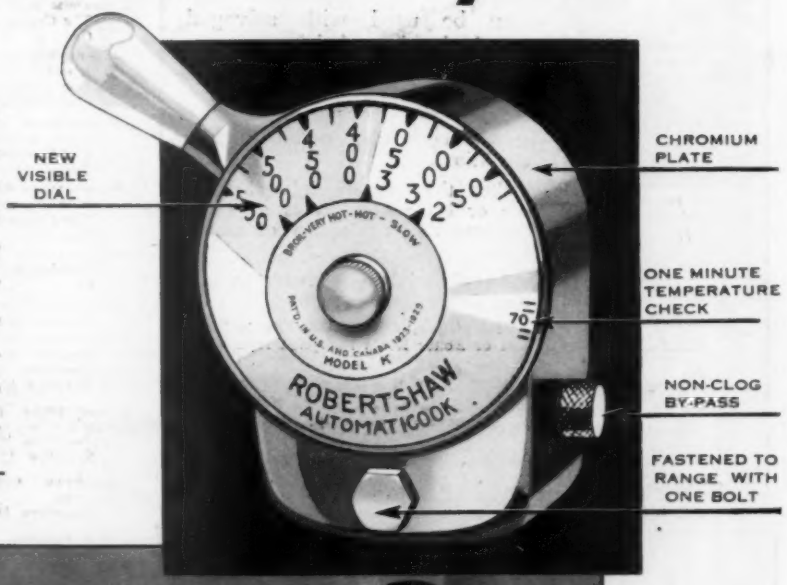

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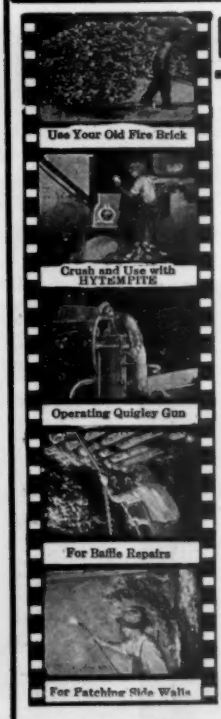

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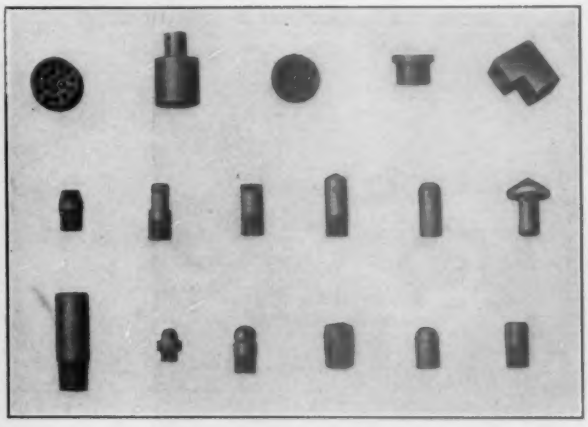

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Barber Gas Burner Co. 468

HOUSE HEATING FURNACES
Geo. D. Rober Corpn. 491

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Ultra Modern Design

—a harmony of symmetrical stream lines and smooth surfaces resulting from cooperation of architects, interior decorators and domestic science experts. The one-piece, welded, "Never-leak" manifold, the air shutters, door hinges, base-band, nuts and bolts are all concealed. Yet, the shutters and gas cocks are easily adjustable without removing any body parts.

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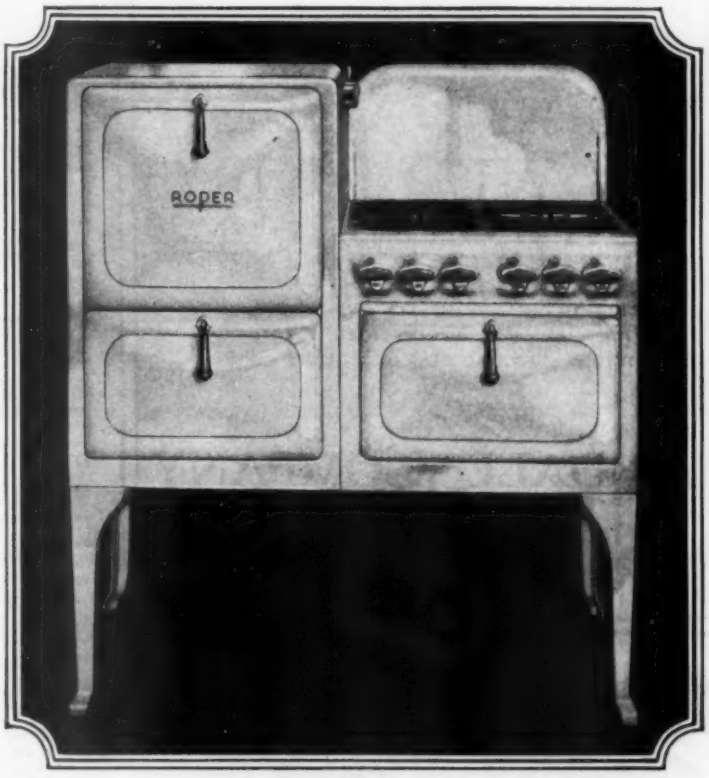

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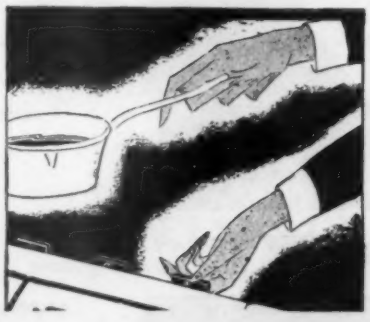

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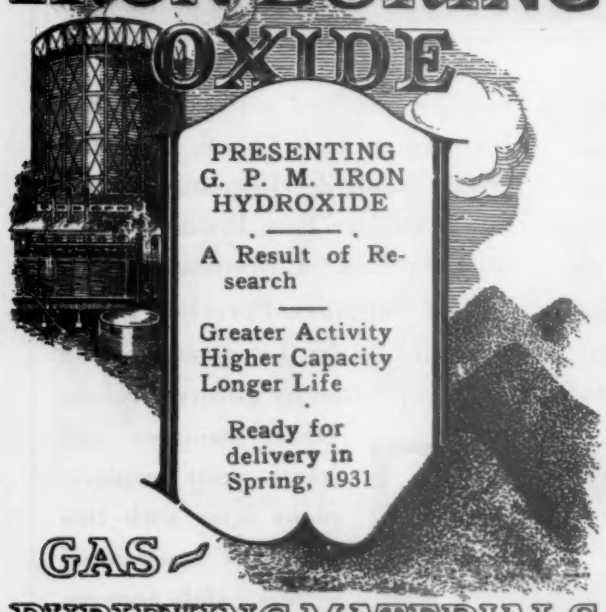

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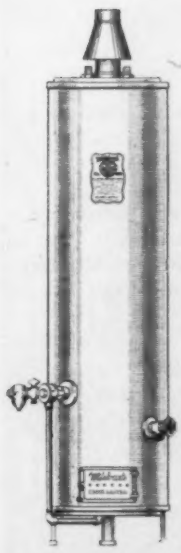

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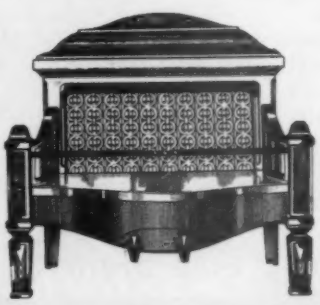

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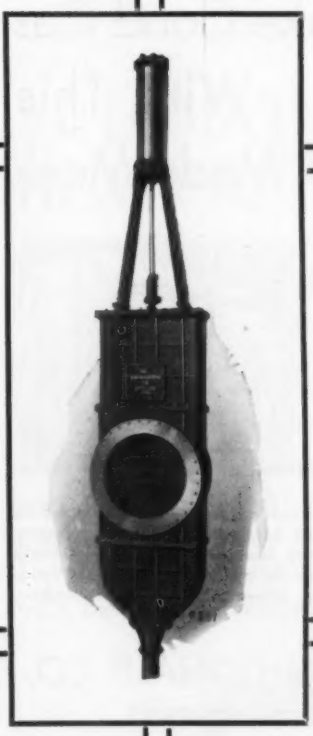

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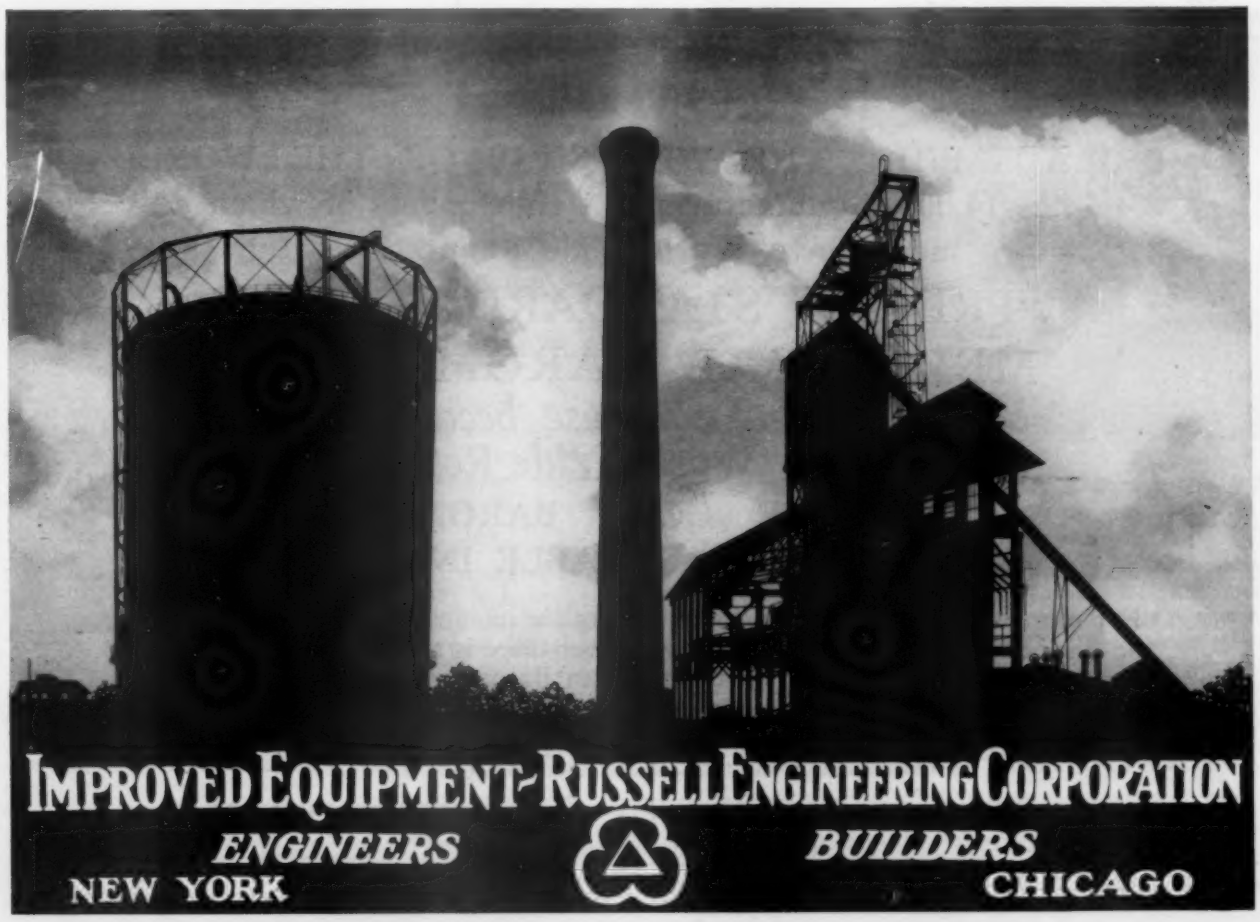

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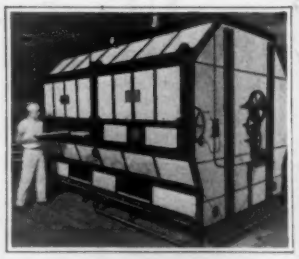

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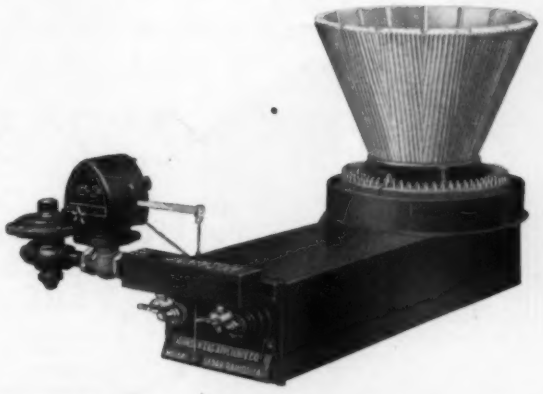

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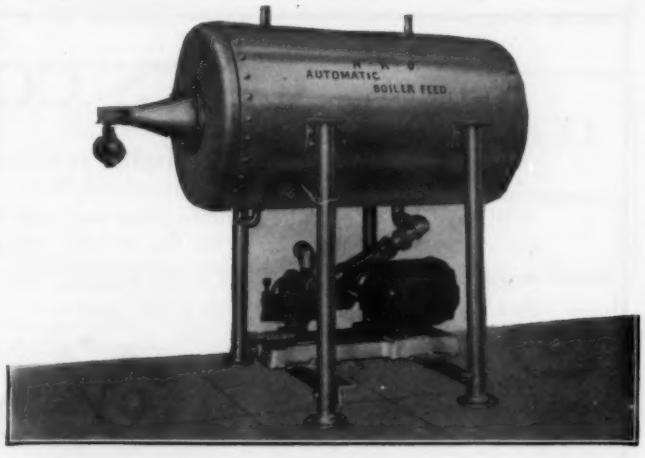

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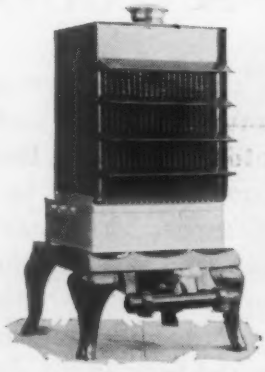
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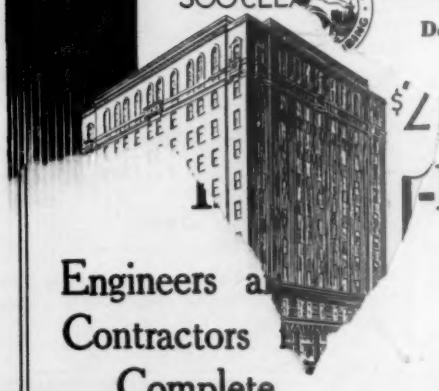

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Wilbraham-Green Co. 11
Wolverine Tube Co. 112

Outline of Articles on

INDUSTRIAL FURNACES for GAS

THIS series will discuss the various characteristics of Industrial Gas Fired Furnaces from the angle of general construction, insulation, use of refractories in the furnace's makeup, applicability of automatic control, efficiency, capacity or output of product per unit of gas consumption, size and space occupied by furnace, what field the furnace particularly serves, competitive figures with other forms of fuel energy, etc., etc. In addition, the series will be accompanied by excellent photographs of typical furnace installations, as well as cross sectional views showing the various important parts of the particular furnace. The type of burner used in each case and a description of whether the gas or air for combustion or both are supplied under pressure will be treated.

PART I—MELTING FURNACES.

A. Metal Pot Furnaces for soft metal melting—lead, tin, babbitt, zinc, aluminum, type metal, etc.
   1. Stationary type—gas designed, converted
   2. Tilting type

B. Crucible Furnaces—for melting of gold, silver, copper, brass, nickel, etc.
   1. Stationary type
   2. Tilting type
   3. Rotary type with metal crucible

C. Pot furnaces for lead and cyanide hardening, oil tempering, etc.

D. Special melting furnaces.
   1. Galvanizing and tinning pots
   2. Stereotype melting
   3. Reverberatory furnaces for high temperature melting and reducing
   4. Monometer for refining, alloying, and dross recovery.

PART II—OVEN FURNACES.

A. Non Muffle Furnaces
   1. Single deck, low temperature—for annealing, hardening, carbonizing, tempering, case hardening
   2. Single deck—for high speed steel
   3. Double deck.

B. Muffle furnaces for specialized heat treating.

C. Combination furnaces—for general tool work, etc.

D. Special furnaces
   1. Car Type
   2. Continuous annealing furnaces—normalizers
   3. Rotary carburizers.

PART III—FURNACES FOR FORGING OPERATIONS.

A. Rivet heating furnaces

B. Standard small forges

C. Special forges
   1. Open slot
   2. Rod and angle
   3. Tube and pipe bending
   4. Hammer forges
   5. Billett
   6. Tire heating

PART IV—INDUSTRIAL OVENS.

A. Core baking ovens
B. Japanning ovens
C. Lithographing ovens
D. Drying ovens

Each considered as follows:
   1. Direct or indirect or exterior unit heater
   2. Shelf, truck, fired rack continuous.

PART V—KILNS.

A. Tunnel—direct and muffle
B. Beehive
C. Dutch

PART VI—THE USE OF AIR HEATERS.

PART VII—FURNACES IN THE GLASS INDUSTRY.

A. Glass tanks
B. Glass Lehrs
C. Miscellaneous furnaces.

PART VIII—ENAMELING FURNACES.

A. Enamel smelters
B. Periodic enameling furnaces—direct and muffle
C. Continuous enameling furnaces

PART IX—MISCELLANEOUS HEATING OPERATIONS.

A. Meat smoking and cooking, potato chip cooking
B. Baking of bread, cake, etc.
C. Varnish cooking
D. Calcination of paint pigments

PART X—INDUSTRIAL STEAM FROM GAS FIRED BOILERS.

PART XI—LARGE SCALE WATER HEATING.

A. Section of heater and tank size
B. Installation, thermostat location, etc.

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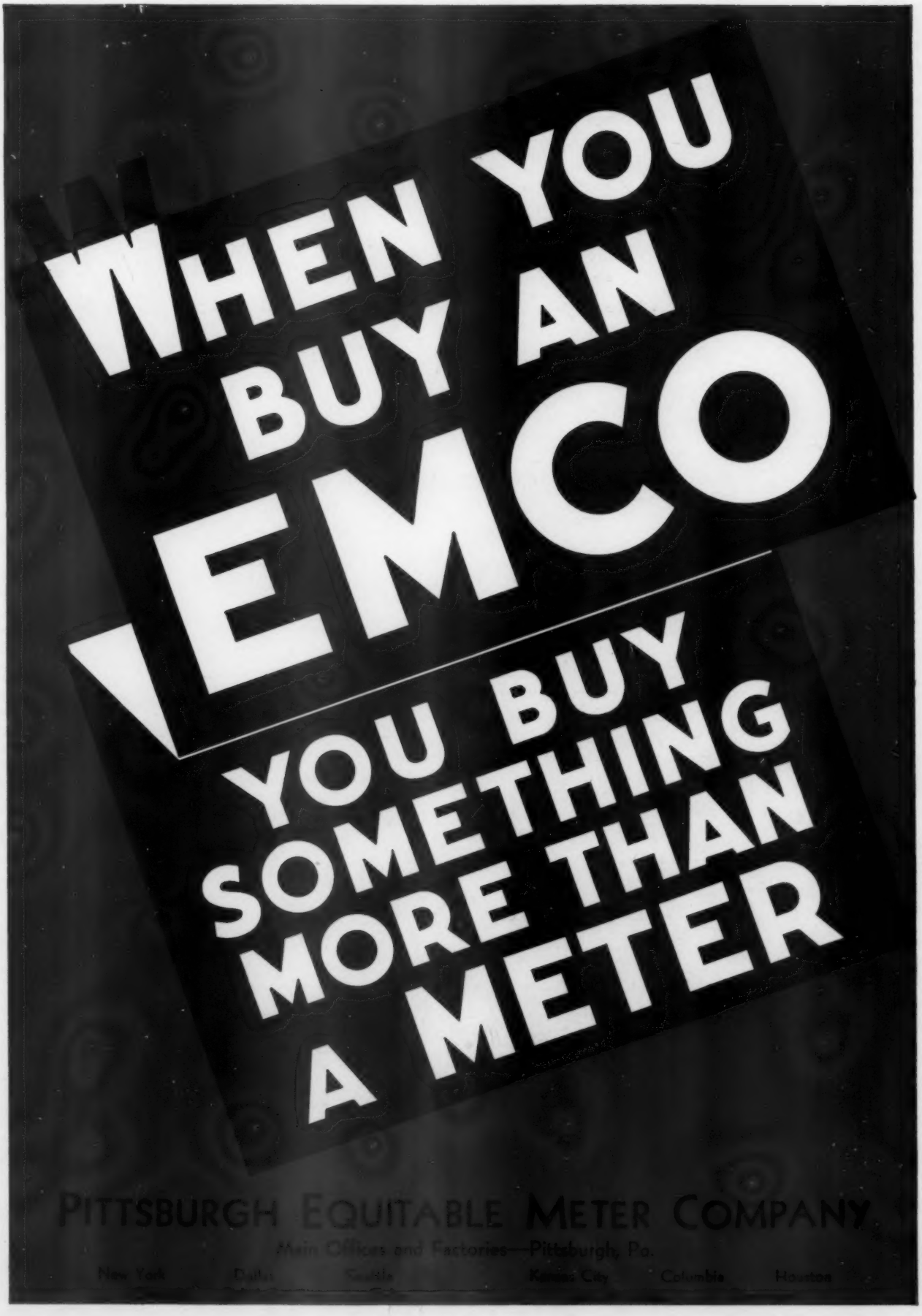
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